University Seat No.:_____ **Centre:**_____
Registration No.:_____ **Sign. of Supervisor:**_____

AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agril. University, Anand
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3. Navsari Agril. University, Navsari
4. S.D. Agril. University, S.K. Nagar

First Semester End Examination of B.Sc.(Hons.) Agriculture (Supple.) June-2015
PART- A: Objective

Course No.: PBG 1.1 **Title of Course**: Economic Botany (1+1)
Date: 08/07/2015 **Time**: 14.00 to 14.45 hrs. **Marks**: 40.0
Total Marks: 40.0
Marks Obtained: [ ]

Q. 1 Tick mark (√) most appropriate option from the following.

1. Which of the following form major component of vegetable fiber?
   (a) Cellulose (c) Hemicelluloses
   (b) Lignin (d) Pectin
2. Coir in coconut is obtained from which part?
   (a) Leaves (c) Fruits
   (b) Roots (d) Seeds
3. Margosa oil is extracted from_____.
   (a) Leaves (c) Seeds
   (b) Flower (d) Roots
4. Drug opium is obtained from which plant?
   (a) Hemp (c) Tobacco
   (b) Poppy (d) Betel
5. Which of the following is/are considered as pseudocereal?
   (a) Grain amaranthus (c) Buck Wheat
   (b) Quinoa (d) All of the above
6. Which of the following is considered as poor man's cereal?
   (a) Wheat (c) Barley
   (b) Triticale (d) Pearl millet
7. Which of the following is correct match?
   (a) Onion Bulb – Modified root (c) *Colocasia* Corm – Modified stem
   (b) Banana Sucker – Modified leaf (d) Conical form of carrot– Modified stem
8. Which of the following is the incorrect pair?
   (a) Fumitory Plant - Tobacco (c) Essential oil - Lemon grass
   (b) Musticatory Plant - Areca nut (d) Forage crop - Ashwagandha
9. Which of the following is the incorrect pair?
   (a) Study of Algae- Algology (c) Study of Mosses- Bryology
   (b) Study of Fungus-Pathology (d) Study of Plant- Botany
10. Which of the following is the incorrect pair?
   (a) Ashwagandha- *Withania somnifera* (c) Indian tea- *Camellia sinensis*
   (b) Coffee- *Coffea arabica* (d) Ground nut- *Glycine soja*

(P.T.O.)

1. Which crop has rich source of gluten content?
   (a) Maize (c) Wheat
   (b) Rice (d) Barley
2. Which is considered as man made cereal?
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   (a) Trees of heaven-Coconut (c) Wonder bean-Cluster bean
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21. In south India the fermented products such as "*Idli*" and "*Dosa*" made up from _____.
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27. Betel leaf is widely used as _____ plant.
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   (b) Spices (d) Condiments

University Seat No.:_____ **Registration No.:**_____

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PART- B: Subjective

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Q.1 (A) Define or explain the following terms (ANY TEN) **(5.0)**

(i) Economic Botany
(ii) Ethanobotany
(iii) Tapping
(iv) Ginning
(v) Curing
(vi) Priming
(vii) Retting
(viii) Topping
(ix) Parboiling
(x) Plant
(xi) Seed
(xii) Germination

Q.1 (B) Outline the classification of economic plant along with atleast one example from each group. **(5.0)**

Q.2 (A) Give the economic importance of below given plant (ANY FIVE) **(5.0)**

(i) Mango
(ii) Pearl millet
(iii) Cotton
(iv) Ground nut
(v) *Hevea brasiliensis*
(vi) Cumin

Q.2 (B) What is essential oil? How it differs from vegetable oil? Enlist the methods of vegetable oil extraction. **(5.0)**

OR

Give the classification of fibres based on their uses.

Q.3 (A) Write short note on (ANY THREE) **(6.0)**

(i) Characteristics that show the prominence of cereals as food crops
(ii) Spices & condiments
(iii) Uses of castor oil
(iv) Give the importance of non-alcoholic beverages.
(v) Parboiling in rice

Q.3 (B) Give the botanical name of following plants (ANY EIGHT) **(4.0)**

(i) Soybean
(ii) Castor
(iii) Cotton
(iv) Rice
(v) Maize
(vi) Sugarcane
(vii) Guar
(viii) Tomato
(ix) Mango
(x) Chick pea

(P.T.O.)

Q.4 (A) Answer in brief (ANY FOUR) **(4.0)**

(i) Why coconut is considered as "*Kalpavriksha*".
(ii) Give the types of sorghum on the basis of their uses.
(iii) Give the importance of pulse crop.
(iv) Classify the fibres according to their uses.
(v) What are the important sugar yielding plants? Mention the economic uses of any one of them.

Q.4 (B) Differentiate the following (ANY THREE) **(3.0)**

(i) Topping and Tapping
(ii) Fumitory and Masticatory Plants
(iii) Gums and Resins
(iv) Drying and Non-drying oils
(v) Cereals and pseudo cereals

Q.4 (C) Draw a neat and labeled diagram of complete flower and write the function of each part. **(3.0)**

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University Seat No : _____ Centre: _____

Registration No.: _____ Sign. of Supervisor: _____

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First Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) December-2015

Part A: Objective

Course No: PBG 1.1 **Title of Course:** Economic Botany (1+1)

Date & Day: 21/12/2015, Monday **Time:** 09:30-10:15 hrs. **Marks:** 40.0

Marks Obtained:

Q-1 Tick mark (√) most appropriate option from the following. (40.0)

1. Who is the 'Father of Botany'?
   (a) Aristotle (b) Vavilov
   (c) Theophrastus (d) Alphonse de Candolle
2. Which of the following is incorrect pair?
   (a) Study of algae -Algology (b) Study of animal – Microbiology
   (c) Study of fungus - Mycology (d) Study of plants - Botany
3. Which is not the characteristic of plant?
   (a) Immortal (b) Life cycle
   (c) Photosynthesis (d) Protoplasm
4. Lancing is generally carried out in _____.
   (a) Opium (b) Tobacco
   (c) Hemp (d) Betel
5. Which of the following is a fodder crop?
   (a) Castor (b) Cotton
   (c) Tobacco (d) Sorghum
6. _____ is the fruit type in castor.
   (a) Pome (b) Regma
   (c) Berry (d) Sorosis
7. Vegetable oil is also known as _____.
   (a) Fixed oils (b) Edible oils
   (c) Expressed oils (d) All of these
8. Aroma in spices is due to presence of_____.
   (a) Proteins (b) Essential oils
   (c) Sugars (d) Pectins
9. Biochemically, cane sugar is _____.
   (a) Maltose (b) Sucrose
   (c) Fructose (d) Arabinose
10. Which is the most common type of reserve food present in green plants?
    (a) Pectins (b) Hemicellulose
    (c) Starch (d) Proteins
11. Which among the following is used for preparation of fruit jelly?
    (a) Cellulose (b) Starch
    (c) Fat (d) Pectins
12. Scientific name of Indian rubber plant is _____.
    (a) *Hevea brasiliensis* (b) *Ficus benghalensis*
    (c) *Ficus elastica* (d) *Ficus religiosa*
13. Essential oils are also known as _____.
    (a) Drying oils (b) Fixed oils
    (c) Non-drying oils (d) Volatile oils

14. Fruits and vegetables are best source of _____.
    (a) Carbohydrates (b) Proteins
    (c) Fats (d) Vitamins and Minerals
15. The branch of science, which deals with the drug plants, is called as _____.
    (a) Surgery (b) Physiology
    (c) Anatomy (d) Pharmacognosy
16. Which of the following is incorrect pair?
    (a) Fumitory plant – Tobacco (b) Essential oil – Lemon grass
    (c) Forage crop - Ashwagandha (d) Masticatory - Arecanut
17. Which among the following is incorrect pair?
    (a) Ashwagandha – *Withania somnifera* (b) Indian tea – *Camellia sinensis*
    (c) Buckwheat – *Amaranthus hypochondrias* (d) Coffee – *Coffea arabica*
18. Which of the following is considered as 'Poor Man's Cereal'?
    (a) Sorghum (b) Triticale
    (c) Pearlmillet (d) Wheat
19. Pulses are rich source of _____.
    (a) Minerals (b) Fats
    (c) Proteins (d) Carbohydrates
20. For Macaroni preparation, _____ type of wheat is most suitable.
    (a) *Triticum durum* (b) *Triticum aestivum*
    (c) *Triticum spelta* (d) *Triticum monococcum*
21. Scientific name of bread wheat is _____.
    (a) *Triticum durum* (b) *Triticum aestivum*
    (c) *Hordeum vulgare* (d) *Triticum monococcum*
22. Which among the following is having good malting quality?
    (a) Wheat (b) Chickpea
    (c) Maize (d) Barley
23. Edible part of orange is _____.
    (a) Thalamus (b) Pericarp
    (c) Juicy placental hairs (d) Bracts
24. Mustard oil is an example of _____.
    (a) Drying oil (b) Non-drying oils
    (c) Semi-drying oil (d) All of these
25. Rhizome is an economically important part of _____.
    (a) Potato (b) Carrot
    (c) Sugarbeet (d) Ginger
26. Alkaloids in plants are derived from the_____.
    (a) Carbohydrates (b) Proteins
    (c) Fats (d) Minerals
27. Which is the example of surface fibres?
    (a) Manilla hemp (b) Cotton
    (c) Flax (d) Ramie
28. Cremocarp fruit type is the characteristic of _____.
    (a) Cotton (b) Wheat
    (c) Coriander (d) Green gram
29. Vegetable oils and fats are triglycerides of_____.
    (a) Organic acid (b) Fatty acid
    (c) Citric acid (d) Ascorbic acid
30. Iodine number of drying oil is_____.
    (a) Less than 100 (b) More than 130
    (c) Between 100 to 130 (d) All of these

(On Page No.3)

Regn. No. _____

31. Gossypol is present in _____ oil.
    (a) Groundnut (b) Niger
    (c) Cotton seed (d) Sunflower
32. Vegetable fats usually contain appreciable amount of _____ an antioxidant.
    (a) Ascorbic acid (b) Citric acid
    (c) Tocopherol (d) Retinol
33. Hydrogenated oils and fats are less prone to _____.
    (a) Rancidity (b) Proteolysis
    (c) Hydrolysis (d) Glycolysis
34. The residue left after the extraction of oil is known as _____.
    (a) Fats (b) Cake
    (c) Liquid (d) Minerals
35. Erucic acid and glucosinolates are associated with the quality of _____ oil.
    (a) Sunflower (b) Mustard
    (c) Soybean (d) Groundnut
36. _____ is the dried meat, or dried kernel of the coconut used to extract coconut oil.
    (a) Toddy (b) Poonac
    (c) Coir (d) Copra
37. Seeds of _____ contain high protein and relatively low oil content.
    (a) Groundnut (b) Soybean
    (c) Sesame (d) Mustard
38. _____ type of inflorescence is present in coconut.
    (a) Catkin (b) Head
    (c) Spadix (d) Syconus
39. _____ seed cake contains ricin and ricinone poisonous substances.
    (a) Castor (b) Soybean
    (c) Groundnut (d) Sesame
40. Pulses are generally deficient in _____ containing amino acids.
    (a) Copper (b) Sulphur
    (c) Manganese (d) Magnesium
41. Lathyrism in human being is associated with the prolong consumption of _____.
    (a) Linseed (b) Lentil
    (c) Khesari dal (d) Lobia
42. Niger belongs to family _____.
    (a) Asteraceae (b) Fabaceae
    (c) Apiaceae (d) Poaceae
43. India's major supply of sugar comes from the _____.
    (a) Sugarbeet (b) Stevia
    (c) Sweet sorghum (d) Sugarcane
44. Betel leaf is widely used as _____ plant.
    (a) Masticatory (b) Spices
    (c) Fumitory (d) Condiments
45. The process of drying the leaves gradually permits certain changes in chemical composition essential for the development of desired quality in tobacco is called as___.
    (a) Priming (b) Desuckering
    (c) Topping (d) Curing
46. *"Katha"*, a masticatory substance obtained from _____ of the *Acacia catechu*
    (a) Flower (b) Leaves
    (c) Heartwood (d) Bark

47. Cocaine obtained from the _____ of the cocaine plant.
(a) Roots (b) Flowers
(c) Leaves (d) Seeds

48. Plucking of leaves is carried out during the harvesting of _____.
(a) Coffee (b) Areca nut
(c) Tea (d) Opium

49. _____ is considered as best in world, as far as the quality is concerned?
(a) African coffee (b) American coffee
(c) Indian coffee (d) Chinese coffee

50. 98 % of global rubber production comes from the _____ plant.
(a) Indian rubber (b) Panama rubber
(c) Para rubber (d) Manicoba rubber

51. Generally, mustard seeds are adulterated with the seeds of _____.
(a) *Avena sativa* (b) *Argemone mexicana*
(c) *Eruca sativa* (d) *Artemisia annua*

52. _____ oil can be used as strong laxative.
(a) Sesame (b) Soybean
(c) Castor (d) Groundnut

53. _____ oil has non-cholesterol and anti-cholesterol properties.
(a) Soybean (b) Sunflower
(c) Sesame (d) Coconut

54. Cereals are rich source of _____ .
(a) Carbohydrates (b) Fats
(c) Protein (d) Minerals

55. Which of the following is not the method of curing in tobacco ?
(a) Air curing (b) Fire curing
(c) Sun curing (d) Water curing

56. Production of aflatoxin is associated with the _____.
(a) Groundnut (b) Soybean
(c) Sesame (d) Sunflower

57. _____ method of vegetable oil extraction is most effective.
(a) Rendering (b) Mechanical
(c) Solvent (d) Hydraulic

58. Vegetable oils are generally _____at ordinary room temperature.
(a) Solid (b) Gaseous
(c) Liquid (d) Vapour

59. Bhang, ganja, smoking substances obtained from the _____ plant.
(a) Opium (b) Hemp
(c) Datura (d) Tobacco

60. _____ is a natural dye yielding plant.
(a) Tobacco (b) Cotton
(c) Henna (d) Mango

61. Process of harvesting matured and ripened tobacco leaves is known as _____.
(a) Desuckering (b) Priming
(c) Curing (d) Topping

62. Which of the following pulse crop is also famous for gum production ?
(a) Soybean (b) Clusterbean
(c) Pigeonpea (d) Chickpea

63. Which oilseed has been considered as 'Queen of Oilseeds' ?
(a) Sesame (b) Groundnut
(c) Sunflower (d) Soybean

(On Page No.5)

64. Young shoots and leaves of ____contain cynogenic glycosides which is toxic to animals.
(a) Bajra (b) Sorghum
(c) Maize (d) Barley

65. _____ is an example of vegetable wax.
(a) Tea (b) Coffee
(c) Jojoba (d) Ber

66. Vegetable oil is predominantly present in _____ .
(a) Stem (b) Flower
(c) Root (d) Seed

67. Resins are soluble in _____.
(a) Turpentine (b) Alcohol
(c) Ether (d) All of these

68. _____ is backbone of man's existence.
(a) Medical science (b) Engineering
(c) Agriculture (d) Physical science

69. Which of the following is spice crop?
(a) Rice (b) Soybean
(c) Green gram (d) Cumin

70. Which of the following is considered as temperate fruit?
(a) Mango (b) Papaya
(c) Apple (d) Phalsa

71. Being an appetizer and possess good aroma and flavour, which is considered as food adjuncts?
(a) Beverages (b) Spices
(c) Medicinal plants (d) Millets

72. Stimulating and refreshing quality of non-alcoholic beverages is due to presence of __.
(a) *Oryzein* (b) *Zein*
(c) *Caffeine* (d) *Triticin*

73. Beer is fermented product of _____.
(a) Grapes (b) Barley
(c) Potato (d) Sugarcane

74. Parboiling in rice conserves _____ from losses during milling process.
(a) Vitamin-A (b) Vitamin-B
(c) Vitamin-D (d) Vitamin-K

75. Which fiber is the longest, toughest and the silkiest of all the plant fibers?
(a) Jute (b) Sisal
(c) Ramie (d) Hemp

76. _____ fiber is used for the preparation of gunny bags.
(a) Jute (b) Ramie
(c) Cotton (d) Flax

77. Grain legumes belong to family _____.
(a) Fabaceae (b) Asteraceae
(c) Poaceae (d) Apiaceae

78. Which of the following is not basic necessity of human life?
(a) Food (b) Shelter
(c) Cloth (d) Mobile phone

79. Extraxylary fibers are present in _____ tissue.
(a) Pith (b) Xylem
(c) Bark (d) Phloem

80. Jute fibers are extracted by the process of _____.
(a) Ginning (b) Hackling
(c) Retting (d) Bleaching

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First Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) December-2015

Part B: Subjective

Course No: PBG 1.1 **Title of Course:** Economic Botany (1+1)
Date: 21/12/2015, Monday **Time:** 10:15-12:00 hrs. **Marks:** 40.0

Q. 1 (A) Define or Explain the following (ANY TEN) **(5.0)**

1. Drying oils
2. Millet
3. Ginning
4. Tapping
5. Rancidity
6. Desuckering
7. Curing
8. Topping
9. Lancing
10. Todding
11. Ethanobotany
12. Retting

Q.1 (B) Classify the vegetable fibers on the basis of their uses along with economic importance. **(5.0)**

OR

Classify the vegetables on the basis of plant parts used along with economic importance.

Q.2 (A) Enlist five pulses with their botanical name and uses. **(5.0)**

OR

Enlist five oilseeds with their botanical name and uses.

Q.2 (B) Give the economic importance of given plant (ANY FIVE) **(5.0)**

1. Pearlmillet
2. Groundnut
3. Turmeric
4. Ashwagandha
5. Cotton
6. Teak

Q.3 (A) Do as directed (ANY THREE) **(6.0)**

1. Characteristics that show prominence of cereals as food crops.
2. Why spices and condiments are commonly known as "food adjuncts"?
3. Enlist different methods of extraction of vegetable oils and describe any one of them in detail.
4. Give the importance of non-alcoholic beverages.

Q. 3 (B) Write botanical names and family of the following (ANY EIGHT) **(4.0)**

1. Rice
2. Coconut
3. Pigeonpea
4. Tea
5. Castor
6. Betel
7. Cumin
8. Mango
9. Para rubber
10. Brinjal

(P.T.O.)

Q.4 (A) Answer in brief (ANY FIVE) **(5.0)**

1. Enlist the characteristics of plant.
2. What are the important sugar yielding plants? Describe any one of them in detail.
3. Economic importance of linseed.
4. Write a note on parboiling in rice.
5. What is food adulteration? Provide various measures to minimize it.
6. Write the importance of castor oil and its derivatives.

Q.4 (B) Differentiate (ANY THREE) **(3.0)**

1. Vegetable oils and essential oils.
2. Fumitory and masticatory plants.
3. Bunch and spreading type of groundnut.
4. Drying and non-drying oil.

Q.4 (C) Draw neat and labeled diagram of simple leaf. **(2.0)**

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Second Semester B.Sc.(Hons.)Agri.(Supplementary) End Examination-2014-15

PBG-2.2:Principles of Genetics(2+1)

"PART-A"

Date:08-01-2015 **Time:10.15 to 12.00hrs**
Thursday **Marks:40**

Q. 1 (A) Define / Explain the following terms (Any Ten) **(5.0)**

1.Genetics	**2.** Linkage	**3.** Duplication
4.Mutation	**5.** Chi-square (X^2)	**6.** Polyploidy
7. Gamete	**8.**Crossing over	**9.**Heterozygous
10. Phenotype	**11.** Back cross	**12.** Tri-hybrid

(B) In pea, Yellow (Y) Seed colour is dominant over green (**y**) as well as round seed shape (**R**) is dominant over wrinkled (**r**). What phenotypic and genotypic ratio would be expected in F_2 from a cross pure Yellow, Round x green, wrinkled? **(3.0)**

(C) Draw the diagram of cell cycle. **(2.0)**

Q. 2 Differentiate the following (Any Five) **(10.0)**

1 Monohybrid and Dihybrid
2 Repulsion phase and Coupling phase
3 Plant cell and Animal cell
4 Quantitative character and Qualitative character
5 DNA and RNA
6 Mitosis and Meiosis

Q. 3 Do as directed (any Five) **(10.0)**

1 Write the Significance of Mitosis
2 Write the examples of multiple alleles
3 Enlist the different cell organelles
4 List the factors affecting crossing over
5 Give classification of structural aberrations
6 Give classification of chromosome based on position of centromere

Q.4 (A) Explain the Law of segregation with suitable example **(3.0)**

(B) Draw a labeled diagram of DNA double helix structure and write its salient features. **(5.0)**

(C) List out different types of gametes produced by the following individuals(I) AaGgDd (II) FFBbEe **(2.0)**

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Candidate Seat No.		Candidate Reg. No.		Signature of Supervisor		
Question No.	1	2	3	4	Total	Signature
Marks						

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Second Semester B.Sc.(Hons.)Agri.(Supplementary) End Examination-2014-15

PBG-2.2:Principles of Genetics(2+1)

"PART-B"

Date:08-01-2015 **Time:9.30 to 10-15 hrs**
Thursday **Marks:40**

Q. 1 **Select most appropriate words for answer and Tick mark (√)** **(10.0)**

1. Duplicate gene interaction gives F_2 phenotype ratio
(a) 9:7 (b) 13:3
(c) 9:6:1 (d) 15:1

2. Dihybrid segregation ratio in F_2 generation is
(a) 9:3:3:1 (b) 1:1:1:1
(c) 3:1 (d) 9:3:1:1

3. Presence of linkage leads to high frequency of
(a) Parental types (b) Recombinants
(c) Segregants (d) None of these

4. Chemical components of chromosome are
(a) DNA (b) Protein
(c) RNA (d) All of these

5. Mendel's law were independently rediscovered by
(a) Tschermak (b) Correns
(c) De Vries (d) All of these

6. Division of centromere in meiosis take place during
(a) Anaphase-I (b) Metaphase-I
(c) Anaphase-II (d) Metaphase-II

7. The cell was first discovered by
(a) Robert Brown (b) Robert Hook
(c) Flemming (d) None of these

8. Cytoplasmic inheritance is also known as
(a) Extra nuclear inheritance (b) Segregants
(c) Both a & b (d) None of these

9. Quantitative characters are controlled by
(a) Single gene (b) Polygenes
(c) Oligogenes (d) All of these

10. Meiosis gives rise to
(a) Four diploid cells (b) Two haploid cells
(c) Two diploid cells (d) Four haploid cells

11. **If one strand of DNA has base sequence CATAGCAT, then its mRNA will have base sequence.**
(a) GTATCGTA (b) GUAUCGUA
(c) TAGAGATA (d) CAGACATA

12. **Type of gametes produced by ddBBCC genotype**
(a) 1 (b) 2
(c) 4 (d) 8

13. **A monosomic individual is represented by**
(a) 2n-1 (b) 2n+2
(c) 2n+1 (d) 2n-2

14. **How many hydrogen bonds join Adenine and Thymine in a DNA molecule?**
(a) One (b) Three
(c) Two (d) Four

15. **Chromosome number of Hexaploid Wheat 2n=**
(a) 42 (b) 14
(c) 21 (d) 32

16. **Centromere is also known as**
(a) Secondary constriction (b) Chromomere
(c) Primary constriction (d) Both a & b

17. **An individual having two copies of same allele is called**
(a) *Heterozygous* (b) *Allelomorph*
(c) Homozygous (d) None of these

18. **In a triple code, three RNA bases code for**
(a) Two amino acid (b) One amino acid
(c) Three amino acid (d) Four amino acid

19. **In mitosis, chromosomes are arranged at equatorial plate during**
(a) Early prophase (b) Late prophase
(c) Metaphase (d) Telophase

20. **The power house of cell is**
(a) *Mitochondria* (b) Chloroplast
(c) Ribosomes (d) Golgi bodies

Q. 2 (A) Match A form B **(5.0)**

	A	Ans. from B		B
1.	Multiple factor hypothesis	[ ]	A	Purine
2.	Double helical model of DNA	[ ]	B	Benzer
3.	Protein synthesis	[ ]	C	Nilson-Ehle
4.	Single ring structure	[ ]	D	Pyrimidine
5.	Double ring structure	[ ]	E	Chloroplast
6.	Digestive enzyme	[ ]	F	Quantitative character
7.	Discontinuous variation	[ ]	G	Ribosomes
8.	Fine structure of gene	[ ]	H	Lysosome
9.	Continuous variation	[ ]	I	Watson and Crick
10.	Photosynthesis	[ ]	J	Qualitative character

Q.2 (B) Mark True (T) or (F) for each of the following statements (5.0)

1. Mitosis occurs in somatic cells. ( )
2. G_1 is post DNA replication phase. ( )
3. The terms genotype and phenotype were coined by Mendel. ( )
4. Chromosomes move towards opposite pole during Anaphase. ( )
5. Paracentric inversion involves centromere. ( )
6. Basic chromosome number is represented by "n". ( )
7. Uracil base is present in DNA. ( )
8. The degree of phenotypic effect of gene in individual is called expressivity. ( )
9. Genetic code has 60 codons. ( )
10. F_1 is crossed with its recessive parent is called backcross. ( )

Q. 3 Fill in the blanks with appropriate word (10.0)

1. Father of Genetics is _____.
2. Transmission of characters from parent to their offspring is called _____.
3. Mutual exchange of segments between non-homologous chromosomes refers to _____.
4. Cytoplasm is contributed to zygote by _____ parent.
5. Linkage between dominant and recessive allele is called _____.
6. _____ refers to presence of more than two alleles at a locus.
7. F_1 crossed with any of the its parents is called _____.
8. An alternative form of a gene is _____.
9. Loops are found in _____ chromosome.
10. The process of mRNA synthesis from a DNA template is known as _____.

Q. 4 Give the appropriate term for each sentence (10.0)

1. Site of gene on a chromosome is known as _____.
2. Manifold effects of gene is called _____.
3. Pairing of homologous chromosomes _____.
4. Nullisomic is represented by _____.
5. An individual with gametic chromosome number_____.
6. _____ genes are present in chloroplast and mitochondria.
7. A sudden heritable change in the genotype of an organism ____.
8. The tendency of one crossover to reduce the chance of another crossover its adjacent region is called _____ .
9. Genetic constitution of an individual is called _____.
10. Division of nucleus _____.

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Second Semester B.Sc.(Hons.)Agri.(Supplementary) End Examination-2014-15

PBG-2.2:Principles of Genetics(2+1)

"PART-A"

Date:08-01-2015 **Time:10.15 to 12.00hrs**
Thursday **Marks:40**

Q. 1 (A) Define / Explain the following terms (Any Ten) **(5.0)**

1.Genetics	2. Linkage	3. Duplication
4.Mutation	5. Chi-square (X^2)	6. Polyploidy
7. Gamete	8.Crossing over	9.Heterozygous
10. Phenotype	11. Back cross	12. Tri-hybrid

(B) In pea, Yellow (Y) Seed colour is dominant over green (y) as well as round seed shape (R) is dominant over wrinkled (r). What phenotypic and genotypic ratio would be expected in F_2 from a cross pure Yellow, Round x green, wrinkled? **(3.0)**

(C) Draw the diagram of cell cycle. **(2.0)**

Q. 2 Differentiate the following (Any Five) **(10.0)**

1 Monohybrid and Dihybrid
2 Repulsion phase and Coupling phase
3 Plant cell and Animal cell
4 Quantitative character and Qualitative character
5 DNA and RNA
6 Mitosis and Meiosis

Q. 3 Do as directed (any Five) **(10.0)**

1 Write the Significance of Mitosis
2 Write the examples of multiple alleles
3 Enlist the different cell organelles
4 List the factors affecting crossing over
5 Give classification of structural aberrations
6 Give classification of chromosome based on position of centromere

Q.4 (A) Explain the Law of segregation with suitable example **(3.0)**

(B) Draw a labeled diagram of DNA double helix structure and write its salient features. **(5.0)**

(C) List out different types of gametes produced by the following individuals(I) AaGgDd (II) FFBbEe **(2.0)**

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1. Anand Agricultural University, Anand
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3. Navsari Agricultural University, Navsari
4. S.D. Agricultural University, S.K. Nagar

Second Semester End Examination of B.Sc. (Hons.) Agri. (Supplementary) Dec-Jan-2015-16

PART-A : Objective

PBG- 2.2 : Principles of Genetics (2+1)

Date: 29/12/2015 **Time :** 9.30 to 10.15 hrs
Day : Tuesday **Total Marks :** 40.00
Marks obtained : ____ ___

Q-1 Tick mark (✓) most appropriate option from the following

1. **Quantitative inheritance exhibits**
   (a) Continuous variation (b) Discontinuous variation
   (c) Both (d) None of these
2. **The term genetics was coined by**
   (a) Punnett (b) Bateson
   (c) Morgan (d) De Vries
3. **Hexaploid wheat is**
   (a) *Triticum monococcum* (b) *T. aestivum*
   (c) *T. durum* (d) None of these
4. **Puffs are found in**
   (a) Lampbrush chromosome (b) B-chromosomes
   (c) Polytene chromosome (d) Isochromosomes
5. **Within a gene, a unit of mutation is called**
   (a) Hot spot (b) Cistron
   (c) Muton (d) Recon
6. **Which of the following base is not present in DNA**
   (a) Adenine (b) Guanine
   (c) Uracil (d) Cytosine
7. **Power house of cell refers to**
   (a) Plastids (b) Mitochondria
   (c) Nucleus (d) Ribosome
8. **Deletion leads to alteration in**
   (a) Sequence of genes (b) Structure of gene
   (c) Gene number (d) All of these
9. **Crossing over occurs during**
   (a) Leptotene (b) Zygotene
   (c) Pachytene (d) Diplotene
10. **Number of gamates produced by genotype AaBbCcDD**
    (a) 3 (b) 8
    (c) 4 (d) 16
11. **The genetic constitution of *Brassica nigra* is**
    (a) CC (b) AA
    (c) BBCC (d) BB

12. **In man, ABO blood group was first discovered by**
    (a) Landsteiner (b) Oliver
    (c) Green (d) Benzer
13. **How many characters Mendel studied in garden pea?**
    (a) 3 (b) 5
    (c) 7 (d) 10
14. **The classical test cross ratio in dihybrid is**
    (a) 1:1:1:1 (b) 9:3:3:1
    (c) 3:1 (d) 1:1
15. **In a triplet code , three RNA bases code for**
    (a) 1 amino acid (b) 2 amino acids
    (c) 3 amino acids (d) several amino acids
16. **Triticale is a hybrid between**
    (a) Wheat & Chick pea (b) Wheat & Rye
    (c) Wheat & Barley (d) Wheat & Rice
17. **Meiosis provides opportunities for**
    (a) Crossing over (b) Synapsis
    (c) Segregation (d) All of these
18. **How many hydrogen bonds join adenine and thymine in a DNA molecule?**
    (a) Single (b) Double
    (c) Triple (d) All of these
19. **An individual having two copies of the same allele is called**
    (a) Heterozygous (b) Homozygous
    (c) Allelomorph (d) None of the above
20. **Pyrimidine include**
    (a) Cytosine (b) Thymine
    (c) Uracil (d) All of these
21. **Site of protein synthesis is**
    (a) Chloroplast (b) Lysosomes
    (c) Ribosomes (d) Mitochondria
22. **Basic chromosome number is represented by**
    (a) x (b) n
    (c) 2n (d) All of these
23. **Allopolyploids contain two or more distinct genomes which are derived from**
    (a) Different location (b) Different species
    (c) Same species (d) Same location
24. **The physical location of a gene on a chromosome is the**
    (a) Locus (b) Allele
    (c) Centromere (d) Chiasmata
25. **In a genome, each type of chromosome is represented**
    (a) Twice (b) Only once
    (c) Thrice (d) Several times
26. **Cytoplasmic inheritance can be studied by**
    (a) Back cross (b) Test cross
    (c) Reciprocal cross (d) All of these
27. **Hexaploid species consist of _____ chromosomes**
    (a) 3X (b) 4X
    (c) X (d) 6X

28. **Mutation that occur in nature is known as**
(a) Spontaneous mutation (b) Unique mutation
(c) Induced mutation (d) All of these

29. **The term mutation was coined by**
(a) Hugo de Vries (b) Morgan
(c) Muller (d) Wright

30. **In zygote the maximum part of cytoplasm is coming from**
(a) Male parent (b) Female parent
(c) New synthesis (d) None of these

31. **Maximum frequency of crossing over is**
(a) 5% (b) 25 %
(c) 50% (d) 75 %

32. **The process of mRNA synthesis from a DNA template is called**
(a) Translation (b) Transcription
(c) Transduction (d) Transformation

33. **Qualitative characters are governed by**
(a) Oligogenes (b) Jumping genes
(c) Polygenes (d) Both (b) & (c)

34. **Multicellular organisms with well-defined nucleus are called**
(a) Prokaryotes (b) Eukaryotes
(c) Karyotes (d) None of these

35. **Linkage between dominant and recessive alleles is known as**
(a) Repulsion phase (b) Coupling phase
(c) Both A & B (d) Non of the above

36. **A phenomenon in which a gene has more than one phenotypic effects**
(a) Penetrance (b) Expressivity
(c) Pleiotropism (d) None of these

37. **Mitosis is observed in following cells**
(a) Reproductive cell (b) Somatic cell
(c) Gametic cell (d) Both A & C

38. **Cytoplasmic inheritance is also known as**
(a) Extra nuclear inheritance (b) Non-mendalian inheritance
(c) Organellar inheritance (d) All of these

39. **A cross of F_1 with its homozygous recessive parent is known as**
(a) Double cross (b) Back cross
(c) Test cross (d) Forward cross

40. **Double helix structure of DNA was proposed by**
(a) Watson & Crick (b) Watson
(c) Crick (d) Jacob & Monad

41. **Interaction among gene refers to**
(a) Homeostasis (b) Pleotropism
(c) Multiple allelism (d) Epistasis

42. **Best stage for studying chromosome associations**
(a) Diplotene (b) Diakinesis
(c) Leptotene (d) Pachytene

43. **Meiosis give rises to**
(a) Two haploid cells (b) Four haploid cells
(c) Two diploid cells (d) Four diploid cells

44. **A gene which exhibits higher mutation rate than other genes is called**
(a) Mutator gene (b) Antimutator gene
(c) Mutable gene (d) Hot spot

45. **Cytoplasmic genes are located in**
(a) Chloroplast (b) Nucleus
(c) Ribosomes (d) Golgibodies

46. **Exchange of segments between non-homologous chromosomes**
(a) Crossing over (b) Translocation
(c) Transformation (d) None of these

47. **Existence of more than two alleles at a locus**
(a) Hypostatic gene (b) Epistatic gene
(c) Alleles (d) Multiple alleles

48. **Chemicals similar to DNA bases are called**
(a) Chemical DNA (b) Alkylating mutagen
(c) Base analogs (d) EMS

49. **Expression of both alleles in F_1 is known as**
(a) Incomplete dominance (b) Complete dominance
(c) Codominance (d) None of these

50. **DNA is a polymer of**
(a) Amino acid (b) Nucleotides
(c) Nucleosides (d) All of these

51. **When centromere is involved in the inversion, it is known as**
(a) Metacentric inversion (b) Pericentric inversion
(c) Paracentric inversion (d) Telocentric inversion

52. **The source of 'A' genome in wheat is**
(a) *T. monococcum* (b) *T. dicoccoides*
(c) *T. duram* (d) *T. turgidium*

53. **Presence of two basic set of chromosome in an individual is known as**
(a) Haploid (b) Polyploid
(c) Diploid (d) Aneuploid

54. **Who is known as father of genetics?**
(a) Mendel (b) Flemming
(c) De Vries (d) Correns

55. **Start signal codon refers to**
(a) UAG (b) AUG
(c) UAA (d) UGA

56. **Nucleus consists of**
(a) Nuclear envelop (b) Nucleolus
(c) Chromatin (d) All of these

57. **Protein is a polymer of**
(a) Amino acids (b) Nucleotides
(c) Nucleosides (d) All of these

58. **How many codons are there in a genetic code?**
(a) 4 (b) 16
(c) 64 (d) 36

59. **Within a gene, a unit of recombination is called**
(a) Hot spot (b) Cistron
(c) Muton (d) Recon

60. **Chromosomes move towards opposite pole during**
(a) Interphase (b) Prophase
(c) Anaphase (d) Metaphase

61. **A chromosome with diffused centromere is called**
(a) Satellite chromosome (b) Nucleolus chromosome
(c) Diffused chromosome (d) Iso chromosome

62. **Dominant epistasis gives ratio in F_2 generation is**
(a) 9:3:4 (b) 12:3:1
(c) 9:6:1 (d) 9:7

63. **Coupling and repulsion phases of linkage were given by**
(a) Morgan (b) Muller
(c) Bateson and Punnett (d) Hutchinson

64. **Heterozygous individuals are represented as**
(a) RR (b) Rr
(c) rr (d) RRTT

65. **DNA synthesis takes place during**
(a) G_1 Phase (b) S-phase
(c) G_2 phase (d) All of above

66. **Jacob and Monod developed the concept of operon model working with**
(a) Drosophila (b) Neurospora
(c) *E. Coli* (d) All of these

67. **Addition of chromosome segment is known as**
(a) Duplication (b) Deletion
(c) Inversion (d) Translocation

68. **A Trisomic individual is represented by**
(a) 2n – 1 (b) 2n – 2
(c) 2n + 1 (d) 2n + 2

69. **Minimum F_2 family size in dihybrid cross**
(a) 4 (b) 16
(c) 64 (d) 24

70. **Which cell organelle is having digestive enzymes**
(a) Ribosomes (b) Golgi bodies
(c) Mitochondria (d) Lysosomes

71. **In maize, cytoplasmic male sterility is governed by**
(a) Mitochondrial gene (b) Chloroplast gene
(c) Ribosomal gene (d) All of these

72. **The bead like structures found within the chromosome is**
(a) Chromomere (b) Chromoneta
(c) Centromere (d) Satellite

73. ***Nilsson Ehle proposed multiple factor hypothesis in***
(a) 1908 (b) 1918
(c) 1924 (d) 1924

74. **Centromere is also known as**
(a) Secondary constriction (b) Primary Constriction
(c) Chromomere (d) All of these

75. **Supplementary gene interaction ratio in F_2 generation is**
(a) 12:3:1 (b) 9:3:4
(c) 9:6:1 (d) 9:7

76. **Chromatids that are attached at the centromere are called what kind of chromatids?**
(a) Programmed (b) Sister
(c) Daughter (d) Mother

77. **A basic or monoploid set of chromosome of an individual is referred to as**
(a) Haploid (b) Genome
(c) Double haploid (d) None of these

78. **RNA is genetic material in**
(a) Virus (b) Fungi
(c) Animals (d) Plants

79. **DNA in which small sequences are repeated several hundred times**
(a) Unique DNA (b) Z- DNA
(c) Repeated DNA (d) m RNA

80. **Nitrogenous bases with single ring structure is known as**
(a) Purines (b) Pyrimidines
(c) a & b (d) None of these

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University Seat No. : _____ Centre : _____
Registration No. : _____ Sign. of Supervisor _____

AGRICULTURAL UNIVERSITIES OF GUJARAT

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Second Semester End Examination of B.Sc. (Hons.) Agricultural (Regular) June-2015

PART-A: Objective

Course No. : PBG 2.2 **Title of Course** : Principles of Genetics
Date : 29/06/2015 **Time:** 9.30 to 10.15 hrs **Marks:** 40.0
Total Marks : 40.0
Marks Obtained : _____

Q-1 Tick mark (√) most appropriate option from the following

1. Nucleolus is found in
   (a) Cytoplasm (b) Hyloplasm (c) Nucleous (d) Lysosome
2. Interaction among gene refers to
   (a) Homeostasis (b) Pleotropism
   (c) Multiple allelism (d) Epistasis
3. The value of recombinants (%) varies from
   (a) 5-10 (b) 0-50 (c) 0-100 (d) 0-10
4. Within a gene, a unit of mutation is called
   (a) Hot spot (b) Cistron (c) Muton (d) Recon
5. The classical test cross ratio in dihybrid is
   (a) 9:3:3:1 (b) 1:1:1:1 (c) 3:1 (d) 1:1
6. Crossing over occurs during
   (a) Laptotene (b) Zygotene (c) Pachytene (d) Diplotene
7. Triticale is a hybrid between
   (a) Wheat and Chickpea (b) Wheat and Rye
   (c) Wheat and Barley (d) Wheat and Rice
8. An individual having two copies of the same allele is called
   (a) Heterozygous (b) Homozygous
   (c) Allelomorph (d) Heterogenous
9. The physical location of a gene on a chromosome is the
   (a) Locus (b) Allele (c) Centromere (d) Chiasmata
10. Quantitative inheritance exhibits
    (a) Continuous variation (b) Discontinuous variation
    (c) Both (d) None of these
11. Mitosis takes place for
    (a) Zygote formation (b) Growth
    (c) Allele formation (d) Gamete formation
12. Cytoplasmic inheritance can be studied by
    (a) Back cross (b) Test cross
    (c) Reciprocal cross (d) Top cross
13. In zygote, the maximum part of cytoplasm is coming from
    (a) Male parent (b) Female parent
    (c) New synthesis (d) None of these
14. The process of mRNA synthesis from a DNA template is called
    (a) Translation (b) Transcription
    (c) Transduction (d) Transformation

(P.T.O)

15. Independent assortment can be studied in
(a) F_1 (b) Parents (c) F_2 (d) None of these

16. Number of gamates produced by genotype AaBbCcDd
(a) 3 (b) 4 (c) 8 (d) 16

17. Germplasm theory was given by
(a) Weisman (b) Mendel (c) Bateson (d) Darwin

18. Cytokinesis is the division of
(a) Cell (b) Nucleus (c) Cytoplasm (d) Chromosome

19. A gene which exhibits higher mutation rate than other genes is called
(a) Mutator gene (b) Antimutator gene
(c) Mutable gene (d) Hot spot

20. DNA in which small sequences are repeated several hundred times is known as
(a) Unique DNA (b) Repeated DNA
(c) Z-DNA (d) mRNA

21. The source of "A" genome in wheat is
(a) *T. monococcum* (b) *T. dicoccoides*
(c) *T. durum* (d) *T. turgidum*

22. Examples in plastid inheritance include
(a) Leaf colour in Four O'clock (b) iojap in maize
(c) Both (a) and (b) (d) CMS in plant

23. How many codons are there in a genetic code?
(a) 4 (b) 16 (c) 64 (d) 32

24. For plant height character parental genctypes AA = 20cm and aa = 10cm and hybrid Aa = 20cm height
(a) Complete dominance (b) Incomplete dominance
(c) Over dominance (d) Co-dominance

25. Protein is a polymer of
(a) Nucleosides (b) Amino acids (c) Nucleotides (d) Fatty acids

26. Within a gene, a unit of recombination is called
(a) Hot spot (b) Cistron (c) Muton (d) Recon

27. Multicellular organisms with well defined nucleus are called
(a) Prokaryotes (b) Eukaryotes (c) Bacteria (d) Virus

28. The bead like structures found within the chromosome is
(a) Chromomere (b) Chromoneta (c) Centromere (d) Satellite

29. The common form of DNA present in living organisms is the
(a) A form (b) Z form (c) C form (d) B form

30. Supplementary gene interaction ratio in F_2 generation is
(a) 12:3:1 (b) 9:3:4 (c) 9:6:1 (d) 9:7

31. Okazaki fragments are formed due to synthesis of DNA in direction
(a) 5' - 3' (b) 3' - 5' (c) Both (d) None

32. A basic or monoploid set of chromosome of an individual is referred to as
(a) Haploid (b) Genome
(c) Double haploid (d) Diplod

33. Dominant epistasis gives ratio in F_2 generation is
(a) 12:3:1 (b) 9:3:4 (c) 9:6:1 (d) 9:7

34. Nitrogenous bases with single ring structure is known as
(a) Purines (b) Pyrimidines
(c) Both (a) and (b) (d) None of these

35. Digestive enzymes are contained in
(a) Plastids (b) Ribosomes (c) Mitochondria (d) Lysosomes

36. The genetic constitution of *Brassica nigra* is
(a) BB (b) AA (c) CC (d) BBCC

On Page No. (3)

37. Deletion leads to alteration in
(a) Gene number (b) Sequence of genes
(c) Structure of genes (d) All of these

38. Aneuploidy refers to
(a) Nullisomics (b) Monosomics (c) Polysomics (d) All of these

39. The gene having masking effect is called
(a) Modifier gene (b) Enhancer gene
(c) Hypostatic gene (d) Epistatic gene

40. Approximate number of turns of DNA on one nucleosome are
(a) 2 (b) 2.5 (c) 3 (d) 10

41. Linkage leads to high frequency of
(a) Recombinant types (b) Parental types
(c) Double cross over (d) None of above

42. How many hydrogen bonds join adenine and thymine in a DNA molecule?
(a) Single (b) Double
(c) Triple (d) Four

43. A gene affecting more than one characters is called
(a) Pleiotropic gene (b) Epistatic gene
(c) Hypostatic gene (d) Enhancer gene

44. Which of the following is start codon?
(a) AUU (b) AUG (c) AGU (d) AAU

45. Frequencies of spontaneous mutation is
(a) 10^{-1} (b) 10^{-6} (c) 10^{-9} (d) 10^{-2}

46. Structural changes of chromosomes are occur due to
(a) Breakage (b) Reunion
(c) Breakage and Reunion (d) All of above

47. Linkage between two or more either dominant or recessive allele is referred to as
(a) Coupling phase (b) Complete linkage
(c) Repulsion phase (d) Autosomal linkage

48. An individual containing two or more different genome from different species
(a) Allopolyploid (b) Autoplolyp oid (c) Diploid (d) Monoploid

49. Cytoplasmic genes are located in
(a) Chloroplast (b) Nucleus (c) Ribosomes (d) Golgibodies

50. When centromere is involved in the inversion, it is known as
(a) Metacentric inversion (b) Pericentric inversion
(c) Paracentric inversion (d) Telocentric inversion

51. Methylmethane sulphonate is
(a) Hormone (b) Base analogue
(c) Physical mutagen (d) Alkylating agent

52. The chromosome replication takes place during the stage
(a) Telophase (b) Prophase (c) Metaphase (d) Interphase

53. Presence of two basic set of chromosome in an individual is known as
(a) Haploid (b) Diploid
(c) Polyploid (d) Aneuploid

54. The wheat (*Triticum aestivum*) is an allohexaploid has the genome
(a) A, B and D (b) A, B and C
(c) A, B, C and D (d) A, B, C, D and E

55. Centromere is also known as
(a) Secondary constriction (b) Primary constriction
(c) Chromomere (d) Chromonema

56. The ABO blood group in man was first discovered by
(a) Mendel (b) Muller (c) Landsteiner (d) Jansen

57. A nullisomic individual is represent by
(a) 2n-1 (b) 2n+1 (c) 2n-2 (d) 2n+2

58. Haploids are represented by
(a) x (b) 2x (c) n (d) 2n

59. Translocation leads to exchange of segments between
(a) Homologous chromosomes (b) Non-homologous chromosomes
(c) Sister chromatids (d) All of the above

60. Meiosis gives rise to
(a) Four haploid cells (b) Four diploid cells
(c) Two haploid cells (d) Two diploid cells

61. Puffs are found in
(a) Lampbrush chromosomes (b) Polytene chromosomes
(c) B-chromosomes (d) Sex chromosomes

62. Who is known as father of genetics?
(a) Mendel (b) Flemming (c) De Vries (d) Correns

63. Mutation was first discovered by
(a) Wright (b) De Vries (c) Muller (d) Standler

64. A chromosome with median position of centromere is known as
(a) Acrocentric (b) Telocentric (c) Submetacentric (d) Metacentric

65. Powerhouse of cell refers to
(a) Plastids (b) Mitochondria (c) Nucleus (d) Lysosomes

66. The experiment cytological proof of crossing over conducted by Curt Stern in
(a) Pea (b) Maize (c) Drosophila (d) Wheat

67. Quantitative traits are govern by
(a) One gene (b) Two gene (c) Three gene (d) Polygene

68. A cross of F_1 with its homozygous recessive parent is known as
(a) Reciprocal cross (b) Test cross
(c) Back cross (d) Top cross

69. Pyrimidine bases include
(a) A and G (b) A and T (c) G and C (d) T, C and U

70. Repeat refers to
(a) Deletion (b) Translocation (c) Duplication (d) Inversion

71. The term genetics was coined by
(a) Bateson (b) Punnett (c) Morgan (d) De Vries

72. A mutation which kills more than 50% of the individual which carry it, is called
(a) Lethal (b) Sub-lethal (c) Sub-vital (d) Vital

73. The multiple factor hypothesis was proposed by
(a) Fisher (b) Mather (c) Nilsson Ehle (d) Falconer

74. 5 Bromo uracil sulphonate is
(a) Base analogue (b) Acridine dye
(c) Alkylating agent (d) Hormone

75. Nucleotide consist of
(a) A phosphate and N base (b) A phosphate and sugar
(c) N base and amino acid (d) A phosphate, sugar and N base

76. How many characters Mendel studied in garden pea?
(a) 3 (b) 5 (c) 7 (d) 10

77. Segregation occurs during
(a) Mitosis (b) Endomitosis (c) Meiosis (d) All of these

78. Chromosome become shorter and thicker during
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

79. Chemical similar to DNA bases are called
(a) Chemical DNA (b) Alkylating mutagen
(c) Base analogs (d) EMS

80. The operon model of gene regulation was proposed by
(a) Crick (b) Jacob and Monod
(c) Watson and Crick (d) Temin

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4. **S.D. Agril. University, S.K. Nagar**

Second Semester End Examination of B.Sc. (Hons.) Agricultural (Regular) June-2015

PART-B: Subjective

Course No. : PBG 2.2 **Title of Course** : Principles of Genetics

Date : 29/06/2015 **Time:** 10.15 to 12.00 hrs **Marks:** 40.0

Q-1 (A) **Define/Explain the following terms (ANY TEN)** **(5.0)**

1.	Multiple allele	2.	Linkage	3.	Ideotype
4.	Paracentric inversion	5.	Mutation	6.	Trihybrid
7.	Recessive allele	8.	Back cross	9.	Polyploidy
10.	Central dogma	11.	Phenotype	12.	Synapsis

Q-1 (B) Explain the law of independent assortment with suitable example. **(5.0)**

Q-2 (A) **Differentiate the following (ANY FIVE)** **(5.0)**

1. Purins and Pyrimidins
2. Mendelian inheritance and Cytoplasmic inheritance
3. Linkage and Crossing over
4. Cytokinesis and Karyokinesis
5. Qualitative traits and Quantitative traits
6. DNA and RNA
7. Autopolyploid and Allopolyploid

Q-2 (B) Explain the multiple factor hypothesis with suitable example. **(5.0)**

Q-3 (A) In pigeonpea, a test cross AaRrBb x aarrbb produces the following segregation pattern: **(5.0)**

Phenotypes	ARB	ArB	ARb	Arb	aRb	aRB	arb	arB	Total
Frequencies	395	44	53	6	46	4	405	47	1000

On the basis of these results, answer the following questions

(a) Find out the correct gene order.
(b) Find out the recombination percentage.
(c) Draw the chromosome map.
(d) Calculate the co-efficient of coincidence.
(e) Calculate the interference.

Q-3 (B) **Describe in brief (ANY TWO)** **(5.0)**

1. Draw a labeled diagram of double helix structure of DNA and give its characteristics/features.
2. Coupling phase of linkage with suitable example.
3. Giant chromosome.

Q-4 **Do as directed (ANY TEN)** **(10.0)**

1. Give the classification of mutagens with examples.
2. Enlist the types of gene interaction with phenotypic ratio.
3. Enlist the characteristics of genetic code.
4. Briefly explain ABO blood groups.
5. Write the significance of meiosis.
6. Give the factors affecting crossing over.
7. Enlist the reasons for Mendel's success.
8. Types of chromosomes on the basis of position of centromere.
9. Evolution of hexaploid wheat.
10. Enlist the type of structural chromosomal aberration.
11. Types of RNA.
12. Draw the diagram of cell cycle.

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Second Semester End Examination of B.Sc. (Hons.) Agricultural (Regular) June-2015

PART-B: Subjective

Course No. : PBG 2.2 **Title of Course** : Principles of Genetics

Date : 29/06/2015 **Time:** 10.15 to 12.00 hrs **Marks:** 40.0

Q-1 (A) **Define/Explain the following terms (ANY TEN)** **(5.0)**

1. Multiple allele 2. Linkage 3. Ideotype
4. Paracentric inversion 5. Mutation 6. Trihybrid
7. Recessive allele 8. Back cross 9. Polyploidy
10. Central dogma 11. Phenotype 12. Synapsis

Q-1 (B) Explain the law of independent assortment with suitable example. **(5.0)**

Q-2 (A) **Differentiate the following (ANY FIVE)** **(5.0)**

1. Purins and Pyrimidins
2. Mendelian inheritance and Cytoplasmic inheritance
3. Linkage and Crossing over
4. Cytokinesis and Karyokinesis
5. Qualitative traits and Quantitative traits
6. DNA and RNA
7. Autopolyploid and Allopolyploid

Q-2 (B) Explain the multiple factor hypothesis with suitable example. **(5.0)**

Q-3 (A) In pigeonpea, a test cross AaRrBb x aarrbb produces the following segregation pattern: **(5.0)**

Phenotypes	ARB	ArB	ARb	Arb	aRb	aRB	arb	arB	Total
Frequencies	395	44	53	6	46	4	405	47	1000

On the basis of these results, answer the following questions

(a) Find out the correct gene order.
(b) Find out the recombination percentage.
(c) Draw the chromosome map.
(d) Calculate the co-efficient of coincidence.
(e) Calculate the interference.

Q-3 (B) **Describe in brief (ANY TWO)** **(5.0)**

1. Draw a labeled diagram of double helix structure of DNA and give its characteristics/features.
2. Coupling phase of linkage with suitable example.
3. Giant chromosome.

Q-4 ***Do as directed (ANY TEN)*** **(10.0)**

1. Give the classification of mutagens with examples.
2. Enlist the types of gene interaction with phenotypic ratio.
3. Enlist the characteristics of genetic code.
4. Briefly explain ABO blood groups.
5. Write the significance of meiosis.
6. Give the factors affecting crossing over.
7. Enlist the reasons for Mendel's success.
8. Types of chromosomes on the basis of position of centromere.
9. Evolution of hexaploid wheat.
10. Enlist the type of structural chromosomal aberration.
11. Types of RNA.
12. Draw the diagram of cell cycle.

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AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agricultural University, Anand
2. Junagadh Agricultural University, Junagadh
3. Navsari Agricultural University, Navsari
4. S.D. Agricultural University, S.K. Nagar

Second Semester End Examination of B.Sc. (Hons.) Agricultural (Supplementary) Dec-2015

PART-B : Subjective

PBG- 2.2 : Principles of Genetics (2+1)

Date: 29/12/2015 **Time :** 10.15 to 12.00 hrs

Day : Tuesday **Total Marks :** 40.00

Q-1 (A) Define/Explain the following terms (ANY TEN) **(5.0)**

1. Linkage 2. Dominant allele 3. Haploid
4. Heredity 5. Synapsis 6. Phenotype
7. Cytoplasmic gene 8. Central dogma 9. Mutation
10 Monohybrid 11. Back cross 12. Chromosome

Q-1 (B) Explain the law of segregation with suitable example. **(5.0)**

Q-2 (A) Differentiate the following (ANY SIX) **(6.0)**

1. DNA and RNA
2. Mitosis and Meiosis
3. Coupling Phase and Repulsion phase
4. Nuclear inheritance and Cytoplasmic inheritance
5. Quantitative inheritance and Qualitative inheritance
6. Plant cell and Animal cell
7. Homozygotes and Heterozytoes

Q-2 (B) In garden pea, yellow seed colour (Y) is dominant over green(y) and tall plant height (T) is dominant over dwarf plant height (t). A homozygote yellow tall plant was crossed with homozygote green dwarf plant. Give the phenotype of F_1 and genotypic as well as phenotypic ratio of F_2. **(4.0)**

Q-3 (A) Draw a labelled diagram of DNA model proposed by Watson and Crick. Give its salient features. **(5.0)**

Q-3 (B) In pigeonpea, a test cross AaBbCc x aabbcc produces the following segregation pattern: **(5.0)**

Phenotypes	ABC	abc	Abc	aBC	ABc	abC	AbC	aBc	Total
Frequencies	349	360	114	116	128	124	5	4	1200

On the basis of these results, answer the following questions

(a) Find out the correct gene order.
(b) Find out the recombination percentage.
(c) Draw the chromosome map.
(d) Calculate the co-efficient of coincidence.
(e) Calculate the interference.

Q-4 Do as directed **(10.0)**

1. Write the examples of multiple alleles.
2. Give the factors affecting crossing over.
3. Draw the diagram of cell cycle.
4. Give the different phases of Meiosis-I.
5. Write the significance of mitosis.
6. How triticale is evolved?
7. Enlist the type of numerical chromosomal aberration.
8. Give the fine structure of gene given by Benzer.
9. Enlist the characteristics of genetic code.
10. Enlist the exceptions of Mendal's Law.

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SUPERVISOR SIGN *REG. NO.*_____ *UNI. SEAT NO.*_____

NAVSARI AGRICULTURAL UNIVERSITY, NAVSARI
SECOND SEMESTER B.SC. AGRIL. BIOTECHNOLOGY END EXAMINATION
(SUPPLEMENTARY)

SUB:COURSE NO.PBG 2.1 **TITLE:**PRINCIPLES OF GENETICS AND CYTOGENETICS
PART-I OBJECTIVE

DATE : 09/01/2014 **TIME :10.00 AM-10.45 AM**

DAY :THURSDAY **MARKS : 40**

Q.1 Write true for correct statement and false for wrong. **10.00**

(a) The complementary base of guanine is cytocine ( )

(b) Phosphodiester bond is present between two nitrogen bases ( )

(c) Transformation phenomenon was confirmed by Harshey and Chase in *pneumoccocus.* ( )

(d) Synapsis is responsible for the differences between two individuals of same species. ( )

(e) Two cells generated by the process of mitosis are same as the parental cells. ( )

(f) Okazaki fragments are generated by replication on lagging strand. ( )

(g) Transcription is the process that take place in cytoplasm of the cell. ( )

(h) Replication,Transcription and Translation are cental dogma of life. ( )

(i) During mitosis,the numbers of chromosomes present within the daughters cells are equivalent to parental cells. ( )

(j) In DNA replication two strands of DNA are unwinded by DNA polymerase. ( )

Q.2 Write the correct answer (A, B, C, D) of the multiple choice question in the parenthesis provided in the left side of each question. **20.00**

(a) What process in the human life cycle results in the production of gametes? ( )

(A) meiosis (B) fertilization

(C) zygote (D) Mitosis

(b) Which of the following is true regarding interphase? ( )

(A) It is the longest phase of cell division.
(B) The cell cytoplasm divides.
(C) Male and female gametes combine to form a zygote.
(D) Chromatids separate during this phase.

(c) Which type of cell division is responsible for the repair of your skin following a sunburn? ( )

(A) mitosis
(B) Meiosis
(C) both meiosis and mitosis
(D) None of the above

(d) Crossing over results in..... ( )

(A) cancerous growths
(B) new genetic combinations
(C) new species
(D) gametes

(e) Which of the following is NOT associated with mitosis? ( )

(A) repair of a cut
(B) production of egg and sperm
(C) growth of the fetus in the womb
(D) growth in height

(f) Chromosomes can be best at the stage of ( )

(A) Late anaphase
(B) Anaphase
(C) Metaphase
(D) Telophase

(g) In mitosis the number of chromosome sets in daughter cells ( )

(A) twice the number
(B) same as in parent cell
(C) on fourth the number
(D) half the number in the parent cell

(h) If a zygote has 4 chromosomes, the somatic cells formed from it have_____ chromosomes. ( )

(A) 4
(B) 8
(C) 2
(D) 16

(i) If gametes have 8 chromosomes, the cell resulting from syngamy will have ____ chromosomes. ( )

(A) 4 (B) 8

(C) 12 (D) 16

(j) Contribution of Paul Berg in the field of genetics is ( )

(A) Recombinant DNA mol. (B) Polymerase chain reaction

(C) Triplet codon (D) pangenesis hypothesis

(k) The bond present between nitrogen bases in DNA is ( )

(A) Phosphodiester bond (B) Nitrogen bond

(C) Hydrogen bond (D) Oxygen bond

(l) Fertilized egg is known as ( )

(A) Gamete (B) Gametophyte

(C) Sporophyte (D) Zygote

(m) DNA is..... ( )

(A) Phosphate group+ribose sugar+nitrogenous base (B) Phosphate group+ deoxyribose sugar+nitrogenous base

(C) Phosphate group+ ribose sugar (D) Deoxyribose sugar + 'N' bases

(n) Crossing over occurs during ( )

(A) Leptotene (B) Pachytene

(C) Diplotene (D) Zygotene

(o) Chromosomal status of pollen is ( )

(A) N (B) 2n

(C) 3n (D) 4n

(p) DNA replication is ..... ( )

(A) Semiconservative (B) Conservative

(C) Dispersive (D) None of above

(q) DNA replication is..... process. ( )

(A) Unidirectional (B) Bidirectional

(C) Multidirectional (D) All of above

(r) .....seq are responsible for termination of DNA replication ( )

(A) Palindromic (B) *Ter*

(C) *Merk* (D) Restriction

(s) Hypothesis of pangenesis is given by ( )

(A) Aristotle (B) Hippocrates

(C) Mendle (D) Morgan

(t) Mitosis is... ( )

(A) Equational (B) Reductional

(C) Directional (D) None of above

Q. 3 Mach of the followings. Write correct answer (A,B,C,D) in the *Parenthesis provided in the middle.* **10.00**

(1)	DNA double helicle structure	( )	**(A)**	Cairns
(2)	Polymerase chain reaction	( )	**(B)**	Watson and Crick
(3)	Recombinant DNA molecule	( )	**(C)**	Harshey and Chase
(4)	Bidirectional DNA replication	( )	**(D)**	Jacob and Monad
(5)	Okazaki fragments	( )	**(E)**	Okazaki
(6)	Bacteriophage T_2	( )	**(F)**	Paul Berg
(7)	Gene regulation	( )	**(G)**	Karry Mullis
(8)	DNA sequencing	( )	**(H)**	Morgan
(9)	Blood theory	( )	**(I)**	Maxam and Gillbert
(10)	Linkage	( )	**(J)**	Aristotle

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NAVSARI AGRICULTURAL UNIVERSITY, NAVSARI
SECOND SEMESTER B.SC. AGRIL. BIOTECHNOLOGY END EXAMINATION
(SUPPLEMENTARY)

SUB:COURSE NO.PBG 2.1 TITLE:PRINCIPLES OF GENETICS AND CYTOGENETICS
PART-I OBJECTIVE

DATE : 09/01/2014 **TIME :10.00 AM-10.45 AM**

DAY :THURSDAY **MARKS : 40**

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(d) Synapsis is responsible for the differences between two individuals of same species. ( )

(e) Two cells generated by the process of mitosis are same as the parental cells. ( )

(f) Okazaki fragments are generated by replication on lagging strand. ( )

(g) Transcription is the process that take place in cytoplasm of the cell. ( )

(h) Replication,Transcription and Translation are cental dogma of life. ( )

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(a) What process in the human life cycle results in the production of gametes? ( )

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(C) both meiosis and mitosis
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(9)	Blood theory	( )	**(I)**	Maxam and Gillbert
(10)	Linkage	( )	**(J)**	Aristotle

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University Seat No. : _____ Centre : _____
Registration No. : _____ Sign. of Supervisor _____

AGRICULTURAL UNIVERSITIES OF GUJARAT

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3. Navsari Agril. University, Navsari
4. S.D. Agril. University, S.K. Nagar

Second Semester End Examination of B.Sc. (Hons.) Agricultural (Regular) June-2015

PART-A: Objective

Course No. : PBG 2.2 **Title of Course** : Principles of Genetics
Date : 29/06/2015 **Time:** 9.30 to 10.15 hrs **Marks:** 40.0

Total Marks : 40.0
Marks Obtained : _____

Q-1 Tick mark (√) most appropriate option from the following

1. Nucleolus is found in
   (a) Cytoplasm (b) Hyloplasm (c) Nucleous (d) Lysosome
2. Interaction among gene refers to
   (a) Homeostasis (b) Pleotropism
   (c) Multiple allelism (d) Epistasis
3. The value of recombinants (%) varies from
   (a) 5-10 (b) 0-50 (c) 0-100 (d) 0-10
4. Within a gene, a unit of mutation is called
   (a) Hot spot (b) Cistron (c) Muton (d) Recon
5. The classical test cross ratio in dihybrid is
   (a) 9:3:3:1 (b) 1:1:1:1 (c) 3:1 (d) 1:1
6. Crossing over occurs during
   (a) Laptotene (b) Zygotene (c) Pachytene (d) Diplotene
7. Triticale is a hybrid between
   (a) Wheat and Chickpea (b) Wheat and Rye
   (c) Wheat and Barley (d) Wheat and Rice
8. An individual having two copies of the same allele is called
   (a) Heterozygous (b) Homozygous
   (c) Allelomorph (d) Heterogenous
9. The physical location of a gene on a chromosome is the
   (a) Locus (b) Allele (c) Centromere (d) Chiasmata
10. Quantitative inheritance exhibits
    (a) Continuous variation (b) Discontinuous variation
    (c) Both (d) None of these
11. Mitosis takes place for
    (a) Zygote formation (b) Growth
    (c) Allele formation (d) Gamete formation
12. Cytoplasmic inheritance can be studied by
    (a) Back cross (b) Test cross
    (c) Reciprocal cross (d) Top cross
13. In zygote, the maximum part of cytoplasm is coming from
    (a) Male parent (b) Female parent
    (c) New synthesis (d) None of these
14. The process of mRNA synthesis from a DNA template is called
    (a) Translation (b) Transcription
    (c) Transduction (d) Transformation

(P.T.O)

15. Independent assortment can be studied in
(a) F_1 (b) Parents (c) F_2 (d) None of these

16. Number of gamates produced by genotype AaBbCcDd
(a) 3 (b) 4 (c) 8 (d) 16

17. Germplasm theory was given by
(a) Weisman (b) Mendel (c) Bateson (d) Darwin

18. Cytokinesis is the division of
(a) Cell (b) Nucleus (c) Cytoplasm (d) Chromosome

19. A gene which exhibits higher mutation rate than other genes is called
(a) Mutator gene (b) Antimutator gene
(c) Mutable gene (d) Hot spot

20. DNA in which small sequences are repeated several hundred times is known as
(a) Unique DNA (b) Repeated DNA
(c) Z-DNA (d) mRNA

21. The source of "A" genome in wheat is
(a) *T. monococcum* (b) *T. dicoccoides*
(c) *T. durum* (d) *T. turgidum*

22. Examples in plastid inheritance include
(a) Leaf colour in Four O'clock (b) iojap in maize
(c) Both (a) and (b) (d) CMS in plant

23. How many codons are there in a genetic code?
(a) 4 (b) 16 (c) 64 (d) 32

24. For plant height character parental genotypes AA = 20cm and aa = 10cm and hybrid Aa = 20cm height
(a) Complete dominance (b) Incomplete dominance
(c) Over dominance (d) Co-dominance

25. Protein is a polymer of
(a) Nucleosides (b) Amino acids (c) Nucleotides (d) Fatty acids

26. Within a gene, a unit of recombination is called
(a) Hot spot (b) Cistron (c) Muton (d) Recon

27. Multicellular organisms with well defined nucleus are called
(a) Prokaryotes (b) Eukaryotes (c) Bacteria (d) Virus

28. The bead like structures found within the chromosome is
(a) Chromomere (b) Chromoneta (c) Centromere (d) Satellite

29. The common form of DNA present in living organisms is the
(a) A form (b) Z form (c) C form (d) B form

30. Supplementary gene interaction ratio in F_2 generation is
(a) 12:3:1 (b) 9:3:4 (c) 9:6:1 (d) 9:7

31. Okazaki fragments are formed due to synthesis of DNA in direction
(a) 5' - 3' (b) 3' - 5' (c) Both (d) None

32. A basic or monoploid set of chromosome of an individual is referred to as
(a) Haploid (b) Genome
(c) Double haploid (d) Diplod

33. Dominant epistasis gives ratio in F_2 generation is
(a) 12:3:1 (b) 9:3:4 (c) 9:6:1 (d) 9:7

34. Nitrogenous bases with single ring structure is known as
(a) Purines (b) Pyrimidines
(c) Both (a) and (b) (d) None of these

35. Digestive enzymes are contained in
(a) Plastids (b) Ribosomes (c) Mitochondria (d) Lysosomes

36. The genetic constitution of *Brassica nigra* is
(a) BB (b) AA (c) CC (d) BBCC

On Page No. (3)

37. Deletion leads to alteration in
(a) Gene number (b) Sequence of genes
(c) Structure of genes (d) All of these

38. Aneuploidy refers to
(a) Nullisomics (b) Monosomics (c) Polysomics (d) All of these

39. The gene having masking effect is called
(a) Modifier gene (b) Enhancer gene
(c) Hypostatic gene (d) Epistatic gene

40. Approximate number of turns of DNA on one nucleosome are
(a) 2 (b) 2.5 (c) 3 (d) 10

41. Linkage leads to high frequency of
(a) Recombinant types (b) Parental types
(c) Double cross over (d) None of above

42. How many hydrogen bonds join adenine and thymine in a DNA molecule?
(a) Single (b) Double
(c) Triple (d) Four

43. A gene affecting more than one characters is called
(a) Pleiotropic gene (b) Epistatic gene
(c) Hypostatic gene (d) Enhancer gene

44. Which of the following is start codon?
(a) AUU (b) AUG (c) AGU (d) AAU

45. Frequencies of spontaneous mutation is
(a) 10^{-1} (b) 10^{-6} (c) 10^{-9} (d) 10^{-2}

46. Structural changes of chromosomes are occur due to
(a) Breakage (b) Reunion
(c) Breakage and Reunion (d) All of above

47. Linkage between two or more either dominant or recessive allele is referred to as
(a) Coupling phase (b) Complete linkage
(c) Repulsion phase (d) Autosomal linkage

48. An individual containing two or more different genome from different species
(a) Allopolyploid (b) Autoplolyp oid (c) Diploid (d) Monoploid

49. Cytoplasmic genes are located in
(a) Chloroplast (b) Nucleus (c) Ribosomes (d) Golgibodies

50. When centromere is involved in the inversion, it is known as
(a) Metacentric inversion (b) Pericentric inversion
(c) Paracentric inversion (d) Telocentric inversion

51. Methylmethane sulphonate is
(a) Hormone (b) Base analogue
(c) Physical mutagen (d) Alkylating agent

52. The chromosome replication takes place during the stage
(a) Telophase (b) Prophase (c) Metaphase (d) Interphase

53. Presence of two basic set of chromosome in an individual is known as
(a) Haploid (b) Diploid
(c) Polyploid (d) Aneuploid

54. The wheat (*Triticum aestivum*) is an allohexaploid has the genome
(a) A, B and D (b) A, B and C
(c) A, B, C and D (d) A, B, C, D and E

55. Centromere is also known as
(a) Secondary constriction (b) Primary constriction
(c) Chromomere (d) Chromonema

56. The ABO blood group in man was first discovered by
(a) Mendel (b) Muller (c) Landsteiner (d) Jansen

57. A nullisomic individual is represent by
(a) 2n-1 (b) 2n+1 (c) 2n-2 (d) 2n+2

58. Haploids are represented by
(a) x (b) 2x (c) n (d) 2n

59. Translocation leads to exchange of segments between
(a) Homologous chromosomes (b) Non-homologous chromosomes
(c) Sister chromatids (d) All of the above

60. Meiosis gives rise to
(a) Four haploid cells (b) Four diploid cells
(c) Two haploid cells (d) Two diploid cells

61. Puffs are found in
(a) Lampbrush chromosomes (b) Polytene chromosomes
(c) B-chromosomes (d) Sex chromosomes

62. Who is known as father of genetics?
(a) Mendel (b) Flemming (c) De Vries (d) Correns

63. Mutation was first discovered by
(a) Wright (b) De Vries (c) Muller (d) Standler

64. A chromosome with median position of centromere is known as
(a) Acrocentric (b) Telocentric (c) Submetacentric (d) Metacentric

65. Powerhouse of cell refers to
(a) Plastids (b) Mitochondria (c) Nucleus (d) Lysosomes

66. The experiment cytological proof of crossing over conducted by Curt Stern in
(a) Pea (b) Maize (c) Drosophila (d) Wheat

67. Quantitative traits are govern by
(a) One gene (b) Two gene (c) Three gene (d) Polygene

68. A cross of F_1 with its homozygous recessive parent is known as
(a) Reciprocal cross (b) Test cross
(c) Back cross (d) Top cross

69. Pyrimidine bases include
(a) A and G (b) A and T (c) G and C (d) T, C and U

70. Repeat refers to
(a) Deletion (b) Translocation (c) Duplication (d) Inversion

71. The term genetics was coined by
(a) Bateson (b) Punnett (c) Morgan (d) De Vries

72. A mutation which kills more than 50% of the individual which carry it, is called
(a) Lethal (b) Sub-lethal (c) Sub-vital (d) Vital

73. The multiple factor hypothesis was proposed by
(a) Fisher (b) Mather (c) Nilsson Ehle (d) Falconer

74. 5 Bromo uracil sulphonate is
(a) Base analogue (b) Acridine dye
(c) Alkylating agent (d) Hormone

75. Nucleotide consist of
(a) A phosphate and N base (b) A phosphate and sugar
(c) N base and amino acid (d) A phosphate, sugar and N base

76. How many characters Mendel studied in garden pea?
(a) 3 (b) 5 (c) 7 (d) 10

77. Segregation occurs during
(a) Mitosis (b) Endomitosis (c) Meiosis (d) All of these

78. Chromosome become shorter and thicker during
(a) Prophase (b) Metaphase (c) Anaphase (d) Telophase

79. Chemical similar to DNA bases are called
(a) Chemical DNA (b) Alkylating mutagen
(c) Base analogs (d) EMS

80. The operon model of gene regulation was proposed by
(a) Crick (b) Jacob and Monod
(c) Watson and Crick (d) Temin

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Uni. Seat No:_____ Centre: _____

Registration No:_____ Supervisor Sign:_____

AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agricultural University, Anand
2. Junagadh Agril. University, Junagadh
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Third Semester End Exam. of B.Sc. (Hons.) Agriculture (Supplementary) July-2015

PART-A: Objective

Course No.PBG 3.3 **Title of course: Principles of Plant Breeding (2+1)**

Date: 06.07.2015 **Time: 14.00 to 14.45 hrs** **Marks: 40.00**

Monday

Marks obtained: ____/40 **Examiner Sign:**_____

Q.1 Tick mark (V) most appropriate option from the following **(40.0)**

1. **Which of the following method considered as a special breeding method?**
   (a) Back cross breeding (b) Pedigree breeding
   (c) Ploidy breeding (d) Bulk breeding
2. **The primitive cultivars which were selected and cultivated by farmers are?**
   (a) Wild relatives (b) Modern cultivars
   (c) Land races (d) Advanced lines
3. **In alfalfa, allogamy condition is due to**
   (a) Cleistogamy (b) Heterostyly
   (c) Herkogamy (d) Male sterility
4. **A condition in which flower opens after fertilization is called**
   (a) Cleistogamy (b) Chasmogamy
   (c) Herkogamy (d) Dichogamy
5. **Genetic male sterility is governed by**
   (a) Cytoplasmic factors (b) Nuclear factors
   (c) Nucleo-Cytoplasmic factors (d) All of these
6. **Self-incompatibility that not arises due to differences in flower morphology?**
   (a) Heteromorphic (b) Gametophytic
   (c) Sporophytic (d) Both (b) and (c)
7. **In CGMS system A line is used as**
   (a) Fertile line (b) Restorer line
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8. **The method of crop improvement in which crossing is required**
   (a) Introduction (b) Pure line selection
   (c) Mass Selection (d) Bulk method
9. **Inbreeding depression is computed by**
   (a) $[(F_2-F_1)/F_1] \times 100$ (b) $[(F_2-F_1)/F_2] \times 100$
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10. **Commercial hybrids in most of the crops are**
    (a) Intra-generic (b) Intra-specific
    (c) Inter-specific (d) Inter-generic
11. **A cross between an inbred line and an open pollinated variety is known as**
    (a) Test cross (b) Back cross
    (c) Top cross (d) All of these

[P.T.O.]

12. Tift-23A is male sterile line of
(a) Pearl millet (b) Sorghum
(c) Wheat (d) Rice

13. In CGMS system, which two lines are isogenic?
(a) A and R (b) B and R
(c) A and B (d) None of these

14. Inbreeding depression is minimum in
(a) Cross-pollinated crops (b) Self-pollinated crops
(c) Vegetatively propagated crops (d) Often cross pollinated

15. The genetic constitution of hybrid variety is
(a) Homozygous and Homogeneous (b) Heterozygous and Heterogeneous
(c) Homozygous and Heterogeneous (d) Heterozygous and Homogeneous

16. Gradual loss of genetic variability in a crop is known as
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17. In which of the following, selection is based on phenotypic performance?
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Third Semester End Exam. of B.Sc. (Hons.) Agriculture (Supplementary) July-2015

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THIRD Semester End Exam. of B.Sc. (Hons.) Agriculture (Supplementary) July-2015

PART-B : Subjective

Course No.PBG 3.3 **Course Title: Principles of Plant Breeding (2+1)**

Date: 06.07.2015 Monday **Time: 14.45 to 16.30 hrs** **Marks: 40.00**

Q-1(A) Define/explain the following (ANY TEN) **(5.0)**

1. Plant breeding
2. Apomixes
3. Heritability
4. Domestication
5. A line
6. Quarantine
7. G x E interaction
8. Pure line
9. Introduction
10. Donor parent
11. Top cross
12. Recurrent selection

Q-1(B) What is back cross breeding? Enlist the basic requirements of backcross method of breeding. Describe the procedure of back cross breeding for transfer of dominant gene for disease resistance. **(5.0)**

Q-2(A) Differentiate the following (ANY FIVE) **(5.0)**

1. Genetic male sterility v/s cytoplasmic male sterility
2. Synthetic variety v/s composite variety
3. General combining ability v/s specific combining ability
4. Primary introduction v/s secondary introduction
5. Vertical resistance v/s horizontal resistance
6. Natural selection v/s artificial selection
7. Protandry v/s protogyny

Q-2(B) What do you mean by relative heterosis, heterobeltiosis, standard heterosis and inbreeding depression? Calculate the per cent relative heterosis, heterobeltiosis, standard heterosis and inbreeding depression using following grain yield data of pearl millet (kg/ha). **(5.0)**

P_1=900 P_2=1100 F_1=1200 F_2= 1100 and standard check =1050

Q-3(A) Justify the following statements (ANY SIX) **(6.0)**

1. Selection within pure line is ineffective.
2. Maize is highly cross-pollinated crop.
3. The knowledge of mode of reproduction is necessary for breeders.
4. The variety developed using backcross method need not be tested in multi-location yield trials.
5. CMS system is used only in vegetatively propagated crops.
6. Breeding for rust resistance is a continuous process.
7. Triploids are always sterile.
8. Farmers have to purchase the seeds of hybrid variety every year.

Q-3(B) Write short notes on the following (ANY TWO) **(4.0)**

1. Self-incompatibility
2. Clonal selection
3. Multi-line variety
4. Pedigree method of selection

[P.T.O.]

Q-4 **Do as directed (ANY TEN)** **(10.0)**

1. Explain briefly Hardy-Weinberg law.
2. List out the objectives of hybridization.
3. What are the various methods of emasculation?
4. Enlist the demerits of mutation breeding.
5. Write the uses of pure lines.
6. How to maintain A, B and R lines?
7. Give full form of CTRI and IIPR.
8. What is the contribution of G.H. Shull and T.S. Venkatraman?
9. Mention the mechanisms that promote cross pollination.
10. Enlist the centers of origin of crop plants as per Vavilov.
11. Give main features of ideotype breeding.
12. What is IPR? Give its various forms.

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AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agricultural University, Anand
2. Junagadh Agril. University, Junagadh
3. Navsari Agril. University, Navsari
4. S.D. Agril. University, S.K. Nagar

Third Semester End Exam. of B.Sc. (Hons.) Agriculture (Supplementary) July-2015

PART-A: Objective

Course No.PBG 3.3 **Title of course: Principles of Plant Breeding (2+1)**

Date: 06.07.2015 **Time: 14.00 to 14.45 hrs** **Marks: 40.00**

Monday

Marks obtained: ____/40 **Examiner Sign:**_____

Q.1 Tick mark (V) most appropriate option from the following **(40.0)**

1. **Which of the following method considered as a special breeding method?**
   (a) Back cross breeding (b) Pedigree breeding
   (c) Ploidy breeding (d) Bulk breeding
2. **The primitive cultivars which were selected and cultivated by farmers are?**
   (a) Wild relatives (b) Modern cultivars
   (c) Land races (d) Advanced lines
3. **In alfalfa, allogamy condition is due to**
   (a) Cleistogamy (b) Heterostyly
   (c) Herkogamy (d) Male sterility
4. **A condition in which flower opens after fertilization is called**
   (a) Cleistogamy (b) Chasmogamy
   (c) Herkogamy (d) Dichogamy
5. **Genetic male sterility is governed by**
   (a) Cytoplasmic factors (b) Nuclear factors
   (c) Nucleo-Cytoplasmic factors (d) All of these
6. ***Self-incompatibility that not arises due to differences in flower morphology?***
   (a) Heteromorphic (b) Gametophytic
   (c) Sporophytic (d) Both (b) and (c)
7. **In CGMS system A line is used as**
   (a) Fertile line (b) Restorer line
   (c) Maintainer line (d) Male sterile line
8. **The method of crop improvement in which crossing is required**
   (a) Introduction (b) Pure line selection
   (c) Mass Selection (d) Bulk method
9. **Inbreeding depression is computed by**
   (a) $[(F_2-F_1)/F_1] \times 100$ (b) $[(F_2-F_1)/F_2] \times 100$
   (c) $[(F_1-F_2)/F_1] \times 100$ (d) $[(F_1-F_2)/F_2] \times 100$
10. **Commercial hybrids in most of the crops are**
    (a) Intra-generic (b) Intra-specific
    (c) Inter-specific (d) Inter-generic
11. **A cross between an inbred line and an open pollinated variety is known as**
    (a) Test cross (b) Back cross
    (c) Top cross (d) All of these

[P.T.O.]

12. **Tift-23A is male sterile line of**
(a) Pearl millet (b) Sorghum
(c) Wheat (d) Rice

13. **In CGMS system, which two lines are isogenic?**
(a) A and R (b) B and R
(c) A and B (d) None of these

14. **Inbreeding depression is minimum in**
(a) Cross-pollinated crops (b) Self-pollinated crops
(c) Vegetatively propagated crops (d) Often cross pollinated

15. **The genetic constitution of hybrid variety is**
(a) Homozygous and Homogeneous (b) Heterozygous and Heterogeneous
(c) Homozygous and Heterogeneous (d) Heterozygous and Homogeneous

16. **Gradual loss of genetic variability in a crop is known as**
(a) Genetic erosion (b) Genetic drift
(c) Genetic Improvement (d) Acclimatization

17. **In which of the following, selection is based on phenotypic performance?**
(a) Mass selection (b) Pure line selection
(c) Pedigree selection (d) Progeny selection

18. **A process of formation of pollen grain is known as**
(a) Megasporogenesis (b) Microsporogenesis
(c) Megagametogenesis (d) Microgametogenesis

19. **A cross between hybrid and recessive parent is known as**
(a) Top cross (b) Test cross
(c) Double cross (d) Back cross

20. **Genetic basis of pure lines or pure line theory was proposed in 1903 by**
(a) Nilsson – Ehle (b) Vilmorin
(c) Shull (d) Johannsen

21. **Improved gluten strength and baking quality is a breeding objective of**
(a) Wheat (b) Barley
(c) Rice (d) Maize

22. **Semi dwarf wheat varieties were initially developed by N. E. Borlaug at**
(a) ICRISAT (b) IBPGR
(c) CIMMYT (d) IARI

23. **Dwarf varieties of rice contain the dwarfing gene from**
(a) Dee-geo-woo-gen (b) Tift 23
(c) Norin 10 (d) Tom thumb

24. **SBI is located at**
(a) Ludhiana (b) Jabalpur
(c) Pantnagar (d) Coimbatore

25. **The world's first pigeon pea hybrid based on CGMS system is**
(a) ICPH 4 (b) ICPH 8
(c) PPH 4 (d) GTH 1

26. **In the name NBPGR the alphabet "R" stands for**
(a) Reservoirs (b) Repository
(c) Resources (d) Regions

27. **Cleistogamy promotes**
(a) Cross-pollination (b) Self-pollination
(c) Geitonogamy (d) All of these

28. **Protoandry is found in the case of**
(a) Rice (b) Wheat
(c) Maize (d) Pearl millet

On page No. -3

29. Self-pollination increases
(a) Homogeneity (b) Homozygosity
(c) Heterogeneity (d) Both (a) and (b)

30. Which is an efficient approach for rapid isolation of homozygous lines?
(a) Pedigree method (b) Bulk method
(c) SSD method (d) Doubled haploid

31. Selection for simply inherited traits can be started from
(a) F_1 (b) F_2
(c) F_3 (d) F_4

32. Triticale was developed from the cross between
(a) Wheat & Oats (b) Wheat & Rye
(c) Wheat & Barley (d) Maize &Teosinte

33. Which is the most widely used method of emasculation?
(a) Hand emasculation (b) Alcohol treatment
(c) Hot water treatment (d) Cold water treatment

34. Diseases are caused by
(a) Fungi & Bacteria (b) Viruses & Nematodes
(c) Bacteria & Nematodes (d) All of these

35. Maximum variability is found in
(a) F_1 generation (b) F_3 generation
(c) F_2 generation (d) F_4 generation

36. The component results from an interaction between two or more genes is
(a) Additive component (b) Dominance component
(c) Epistatic component (d) All of these

37. International Rice Research Institute (IRRI) is located at
(a) Mexico (b) China
(c) Japan (d) Philippines

38. The adjustment of a species or population to a changed environment over a number of generations is termed as
(a) Adjustment (b) Domestication
(c) Adaptation (d) Acclimatization

39. The parental lines crossed to produce hybrid seed are
(a) A and B line (b) B and C line
(c) B and R line (d) A and R line

40. Who had developed the concept of vertical and horizontal resistance?
(a) Shull G.H. (b) Vander Plank J.E
(c) East E.M. (d) Garber R.J.

41. Which among the followings are the forms of gene bank?
(a) Field bank (b) Shoot tip bank
(c) Seed bank (d) All of these

42. Which of the following is the scientific name of 'noble cane'?
(a) *S. officinarum* (b) *S. spontaneoum*
(c) *S. robustum* (d) *S. barberi*

43. Who had given first hybrid of Sweet Williams x Carnation?
(a) Mendel, G.J. (b) Knight, T.A.
(c) Rimpu (d) Thomas Fairchild

44. Nullisomic is represented by
(a) 2n+1 (b) 2n+2
(c) 2n-1 (d) 2n-2

45. Progeny developed by continue selfing in cross-pollinated crop is
(a) Inbred (b) Pure line
(c) Clone (d) Hybrid

46. On selfing, homozygosity is increased in every generation by
(a) 25% (b) 50%
(c) 75% (d) 100%

47. The progeny of a single self-fertilized homozygous individual is
(a) Synthetic (b) Clone
(c) Pure line (d) Hybrid

48. The concept of centers of origin was proposed by
(a) N. I. Vavilov (b) C. Linnaeus
(c) J. R. Harlan (d) J. B. Hutchinson

49. Removal of stamens from parent plants before they shed pollens is called
(a) Sterilization (b) Pollination
(c) Emasculation (d) Hybridization

50. Directorate of Groundnut Research (DGR) is located in the state of
(a) Andhra Pradesh (b) Karnataka
(c) Tamil Nadu (d) Gujarat

51. The ratio of genotypic variance to that of phenotypic variance is
(a) Broad sense heritability (b) Narrow sense heritability
(c) Repeatability (d) Genetic advance

52. Which of the following variance is associated with heterosis?
(a) SCA (b) GCA
(c) Both SCA and GCA (d) None of these

53. The parent used only once in back cross breeding programmeis
(a) Recipientparent (b) Recurrent parent
(c) Donor parent (d) None of these

54. Heterosis can be fully exploited in the form of
(a) Hybrids (b) Composites
(c) Synthetics (d) Multilines

55. Commercial banana cultivars never set seeds due to
(a) Diploid (b) Triploid
(c) Tetraploid (d) Pentaploid

56. General combining ability is related with
(a) Parents (b) Hybrids
(c) Cybrids (d) None

57. The dominance hypothesis of heterosis was proposed by
(a) East (b) Davenport
(c) Hull (d) Shull

58. Superiority of F_1 over its parent in vegetative growth is known as
(a) Heterosis (b) Luxuriance
(c) Heterobeltiosis (d) All of these

59. The crossing between genetically dissimilar individuals is known as
(a) Hybridization (b) Selfing
(c) Inbreeding (d) Cloning

60. The number of possible single crosses (excluding reciprocals) is calculated by
(a) n (n-3)/2 (b) n (n-2)/2
(c) n (n-1) (n-2) (n-3)/8 (d) n (n-1)/2

61. Every year, the farmers have to purchase fresh seed in case of
(a) Hybrid variety (b) Synthetic variety
(c) Composite variety (d) All the above

62. The crop showing less than 5 % cross pollination is considered as
(a) Self-pollinated crop (b) Cross-pollinated crop
(c) Often Cross-pollinated crop (d) Often self-pollinated crop

On page No.-(5)

63. Basic requirement of back cross programme is/are
(a) Suitable Recurrent parent (b) High heritability of character
(c) Suitable Donor parent (d) All of these

64. Which among the following heterosis having commercial value?
(a) Relative heterosis (b) Standard heterosis
(c) Heterobeltiosis (d) Luxuriance

65. In parthenogenesis, embryo develops from
(a) Egg cell (b) Antipodal cell
(c) Synergids (d) Pollar nuclei

66. The basic chromosome number of wheat is
(a) 21 (b) 28 (c) 7 (d) 14

67. Vertical resistance is govern by
(a) Polygenes (b) Minor genes
(c) Oligo-genes (d) Quantitative genes

68. Concept of ideotype breeding is given by
(a) Johannsen (b) Donald
(c) Vilmorin (d) Jones

69. Megasporogenesis produces
(a) Microspore (b) Egg cell
(c) Pollen grain (d) Megaspore

70. Hardy –Weinberg law implies in the absence of
(a) Migration (b) Mutation
(c) Random drift (d) All of these

71. Progeny of the plant propagated asexually is
(a) Inbred (b) Purline
(c) Multiline (d) Clone

72. Castor is
(a) Dioecious (b) Monoecious
(c) Andro-monoecious (d) Gyno-dioecious

73. The term heterosis is given by
(a) Bruce (b) Jones
(c) Shull (d) Hull

74. Father of hybrid cotton was
(a) C.T.Patel (b) B.T.Patel
(c) B.P.Pal (d) M.S.Randhawa

75. Self-incompatibility promotes
(a) Self-pollination (b) Cross pollination
(c) Inbreeding (d) Homozygosity

76. Disease resistance genes can be obtained from
(a) Wild relatives (b) Germplasm lines
(c) Other varieties (d) All of these

77. Introduction of germplasm from one state to another state is known as
(a) Primary introduction (b) Secondary introduction
(c) Indigenous introduction (d) Exotic introduction

78. Which among the following is not covered under IPR?
(a) Patents (b) Copyrights
(c) Trademark (d) Trade business

79. Recurrent selection is most widely used in
(a) Self-pollinated crops (b) Cross-pollinated crops
(c) Vegetatively propagated crops (d) All of these

80. Sum total of all the genes present in a population is termed as
(a) Gene frequency (b) Genotype frequency
(c) Hybrid pool (d) Gene pool

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Third Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) Dec-15

PART-A : Objective

Course No. PBG 3.3 **Title of course: Principles of Plant Breeding (2+1)**

Date: 16.12.2015 **Time: 9.30 to 10.15 hrs** **Marks: 40.00**

Wednesday

Marks obtained: ____ /40 **Examiner 's Sign:**_____

Q.-1 Tick mark (√) most appropriate option from the following **(40.0)**

1. **Which of the following is an example of secondary introduction in wheat?**
   (a) Kalyansona (b) Sonara 64
   (c) Lerma Rajo (d) NP 308
2. **Which of the following method is applicable to self and cross-pollinated crops?**
   (a) SSD method (b) Hybrid development
   (c) Bulk method (d) Synthetic development
3. **Vilmorin developed the concept of**
   (a) Pureline (b) Progeny test
   (c) Self incompatibility (d) Recurrent selection
4. **The geitonogamy condition is found in**
   (a) Maize (b) Wheat
   (c) Pigeonpea (d) Papaya
5. **The quickest method of varietal development is**
   (a) Pedigree method (b) Plant introduction
   (c) Mass selection (d) Bulk method
6. **Which method of plant breeding is not used for asexually propagated crops?**
   (a) Plant introduction (b) Clonal selection
   (c) Mutation breeding (d) Pureline selection
7. **Which among the following is an often cross-pollinated crop?**
   (a) Alfalfa (b) Groundnut
   (c) Pigeon pea (d) Rice
8. **In parthenogenesis, embryo directly developed from**
   (a) Synergid cells (b) Egg cell
   (c) Antipodal cells (d) Nucellus cell
9. **The most commonly used gene pool is**
   (a) Primary (b) Secondary
   (c) Tertiary (d) Quarterly

[P.T.O]

10. **Additive genetic variance is**
(a) Heritable and fixable (b) Non-heritable and fixable
(c) Heritable and non-fixable (d) Non-heritable and non-fixable

11. **The process of bringing wild species under human management is**
(a) Selection (b) Plant introduction
(c) Domestication (d) Acclimatization

12. **Heterosis can be fully exploited in the form of**
(a) Synthetic variety (b) Composite variety
(c) Hybrid variety (d) Multiline variety

13. **For seed yield per plant in castor, P_1 = 100 g, P_2 = 120 g and F_1 = 150 g. What is the per cent heterobeltiosis for this trait?**
(a) 25 % (b) 50 %
(c) 75 % (d) -50 %

14. **Breeding behavior of a plant can be determine through**
(a) Progeny test (b) Back cross
(c) Mass selection (d) Pureline selection

15. **A cross between an inbred and an open pollinated variety is**
(a) Three way cross (b) Double top cross
(c) Top cross (d) Direct cross

16. **The concept of center of origin was proposed by**
(a) N. I. Vavilov (b) C. Linneaeus
(c) J. R. Harlen (d) J. B. Hutchinson

17. **Which of the following is fully compatible matting in gametophytic self-incompatibility?**
(a) S_1S_2 x S_1S_2 (b) S_1S_2 x S_3S_4
(c) S_2S_3 x S_3S_4 (d) S_1S_2 x S_2S_3

18. **Which of two lines are isogenic for male sterility system?**
(a) A and R line (b) B and R line
(c) A and B line (d) None of these

19. **Collection of germplasm from foreign country is called**
(a) Indigenous collection (b) Indian collection
(c) Local collection (d) Exotic collection

20. **The source of dwarfing gene in wheat is**
(a) Dee-geo-woo-gen (b) Tift-23A
(c) Kafir (d) Norin-10

21. **Reciprocal differences is found in case of**
(a) Heteromorphic system (b) Gametophytic system
(c) Sporophytic system (d) None of these

22. **Breeding scheme which provides maximum opportunity for breeders to utilize his skill and judgement is**
(a) Pedigree method (b) Mass selection
(c) Bulk method (d) SSD method

23. **Gradual loss of genetic variability in a crop species is known as**
(a) Genetic drift (b) Genetic erosion
(c) Acclimatization (d) Genetic gain

[To page No. 3]

24. **Pollen grain formation takes place by the process of**
(a) Micro-sporogenesis (b) Mega-sporogenesis
(c) Micro-gametogenesis (d) Mega-gametogenesis

25. **Minimum inbreeding depression observed in**
(a) Self-pollinated crops (b) Cross-pollinated crops
(c) Often cross-pollinated crops (d) Vegetative propagated crops

26. **The primitive cultivars selected and cultivated by farmers are**
(a) Modern cultivars (b) Wild relatives
(c) Obsolete cultivars (d) Land races

27. **A cross between *G. hirsutum* and *G. barbadense* is**
(a) Inter-varietal cross (b) Inter-specific cross
(c) Inter-generic cross (d) Introgressive cross

28. **Which method is useful to rectify specific defect of a well adapted variety?**
(a) SSD breeding (b) Heterosis breeding
(c) Backcross breeding (d) Pedigree breeding

29. **For grain yield per plant in maize, F_1 and F_2 generations have 200 g and 175 g yield respectively. Calculate the percentage of inbreeding depression for this trait.**
(a) 6.5 % (b) 12.5 %
(c) 14.2 % (d) 28.4 %

30. **The most commonly used agent for chromosome doubling is**
(a) EMS (b) Colchicine
(c) Ethidium bromide (d) MMS

31. **The term heterosis was first used by**
(a) Bruce (1908) (b) Jones (1917)
(c) Shull (1914) (d) Hull (1945)

32. **If 20 inbreds are crossed in all possible combinations, the total number of single crosses (excluding reciprocals) would be**
(a) 160 (b) 175
(c) 190 (d) 380

33. **Dominance hypothesis was first proposed by**
(a) Davenport (1908) (b) Jones (1917)
(c) Donald (1968) (d) Hull (1945)

34. **Monosomic condition is represented by**
(a) 2n-2 (b) 2n-1
(c) 2n+1 (d) 2n+2

35. **Combining ability is not measure in case of**
(a) Simple recurrent selection (b) Recurrent selection for GCA
(c) Recurrent selection for SCA (d) Reciprocal recurrent selection

36. **In case of immune reaction, the rate of reproduction (r) of the pathogen is**
(a) $r = 1$ (b) $r = 0.5$
(c) $r = 0$ (d) $0 < r > 1$

37. **Yield prediction and reconstitution is possible in case of**
(a) Open pollinated variety (b) Synthetic variety
(c) Composite variety (d) Pureline variety

38. **Random mating population is also known as**
(a) Mendelian population (b) Panmictic population
(c) Both (a) and (b) (d) Neither (a) nor (b)

39. **Genetic constitution of clone is**
(a) Heterozygous & homogeneous (b) Homozygous & heterogeneous
(c) Homozygous & homogeneous (d) Heterozygous & heterogeneous

40. ***Raphanobrassica* is a combination of**
(a) Radish and Cauliflower (b) Radish and mustard
(c) Radish and turnip (d) Radish and Cabbage

41. **Which of the following is a method of handling segregating population?**
(a) Introduction (b) Mass selection
(c) Pedigree breeding (d) Pureline selection

42. **A cross between tetraploid (4n) and diploid (2n) is**
(a) Diploid (b) Triploid
(c) Tetraploid (d) Hexaploid

43. **The frequency of recessive genotype (aa) is 0.64. What is the frequency of heterozygote (Aa)?**
(a) 0.16 (b) 0.32
(c) 0.48 (d) 0.64

44. **The concept of plant ideotype was given by**
(a) Stadler (b) Peterson
(c) Muller (d) Donald

45. **The process by which individual plant or group of plant are sort out from mixed heterogeneous population is known as**
(a) Domestication (b) Selection
(c) Germplasm (d) Hybridization

46. **Male sterility and self incompatibility promotes**
(a) Self pollination (b) Cross-pollination
(c) Both (a) and (b) (d) Neither (a) nor (b)

47. **Gene for gene hypothesis was first proposed by**
(a) Vavilov (b) Flor
(c) Plank (d) Shull

48. **SSD method was first proposed by**
(a) Goulden (b) Nagaharu
(c) Jenkins (d) Rimpu

49. **Individual plant selection is done from F_2 to F_5 generation in case of**
(a) Mass selection (b) Bulk method
(c) Pedigree method (d) SSD method

50. **Quarantine measures should be taken up for**
(a) Diseases (b) Insects
(c) Noxious weeds (d) All of these

51. **Rust screening test for transfer of recessive gene is carried out in**
(a) BC_1 and BC_3 generations (b) BC_1F_2 and BC_3F_2 generations
(c) BC_2 and BC_4 generations (d) BC_2F_2 and BC_4F_2 generations

[On page No. 5]

52. **Potato is**
(a) Auto-triploid (b) Allo-triploid
(c) Auto-tetraploid (d) Allo-tetraploid

53. **When two species unable to cross directly, a third species may be used as a**
(a) Guided species (b) Major species
(c) Minor species (d) Bridge species

54. **The concept of general and specific combining ability was first proposed by**
(a) Sprague and Tatum (b) Kempthorne
(c) Burton and DeVane (d) Russell

55. **Conservation of germplasm away from its natural habitat is**
(a) *In-situ* conservation (b) *Ex-situ* conservation
(c) Active conservation (d) Core conservation

56. **Protogyny condition is observed in**
(a) Pearl millet (b) Barnyard millet
(c) Kodo millet (d) Little millet

57. **The causes of heteromorphic self incompatibility system is due to**
(a) Morphological (b) Physiological
(c) Biochemical (d) Transgenic

58. **Head quarter of NBPGR is located at**
(a) Hyderabad (b) New Delhi
(c) Chennai (d) Bangalore

59. **The ratio of additive genetic variance to total variance is called as**
(a) Repeatability (b) Co-heritability
(c) Narrow sense heritability (d) Broad sense heritability

60. **The loss in vigour and productivity of clones with time is called**
(a) Clonal selection (b) Clonal reselection
(c) Clonal degeneration (d) Clonal mutation

61. **Synthetic variety can be produced and maintained in**
(a) Self-pollinated crops (b) Cross-pollinated crops
(c) Vegetatively propagated crops (d) All of these

62. **The genetic variation in pureline may arises due to**
(a) Mutation (b) Natural crossing
(c) Mechanical mixture (d) All of these

63. **CMS system is used for hybrid seed production in**
(a) Okra (b) Brinjal
(c) Onion (d) Tomato

64. **In every generation of selfing homozygosity is increased by**
(a) 12.5 % (b) 25 %
(c) 50 % (d) 75 %

65. **Which breeding method takes longest time for development of new variety?**
(a) Back cross method (b) Bulk method
(c) SSD method (d) Pedigree method

66. **In CGMS, A line is used as**
(a) Male sterile line (b) Male fertile line
(c) Maintainer line (d) Restorer line

67. **Which of the following is non-allelic gene interaction?**
(a) Additive (b) Dominance
(c) Epistasis (d) All of these

68. **Pre-requisite for initiation of crop improvement is**
(a) Genetic variation (b) Hybridization
(c) Mutation (d) Male sterility

69. **A trip for collection of germplasm for crop species is called as**
(a) Exploitation (b) Exploration
(c) Conservation (d) Extinction

70. **In heterosis breeding, the value of P_1 is 10 units and that of P_2 is 12 units. Which is the correct case of heterobeltiosis?**
(a) 8 units (b) 10 units
(c) 12 units (d) 14 units

71. **How many back crosses are required to transfer a simply inherited trait under conventional backcross breeding programme?**
(a) 1-2 (b) 5-6
(c) 9-10 (d) 14-15

72. **An individual having more than two basic set of chromosomes**
(a) Haploidy (b) Aneuploidy
(c) Monoploidy (d) Euploidy

73. **How many inbreds required for double cross hybrid?**
(a) One (b) Two
(c) Three (d) Four

74. **For development of hybrid, emasculation is required in case of**
(a) Self incompatibility (b) Pistillate line
(c) Male sterility (d) Bisexual flower

75. **Multiline is generally a mixture of**
(a) Hybrids (b) Clones
(c) Isogenic lines (d) Non-isogenic lines

76. **Sum total of all the genes present in random mating population is called as**
(a) Gene pool (b) Gene frequency
(c) Genotype frequency (d) Genetic drift

77. **The term 'Noblization' is related with**
(a) Sorghum (b) Soybean
(c) Sugar beet (d) Sugarcane

78. **Which of the following cross (P_1 x P_2) is called three-way cross**
(a) $(P_1 \times P_2) \times P_1$ (b) $(P_1 \times P_2) \times (P_1 \times P_2)$
(c) $(P_1 \times P_2) \times P_2$ (d) $(P_1 \times P_2) \times P_3$

79. **M. S. Swaminathan is famous for**
(a) Green revolution (b) Hybrid development in rice
(c) Synthetic development in maize (d) Bt-cotton

80. ***The most common and widely used form of gene bank is***
(a) DNA bank (b) Shoot tip bank
(c) Seed bank (d) RNA bank

****

Uni. Seat No:_____	**Centre: _____**
Registration No:_____	**Supervisor Sign:_____**

AGRICULTURAL UNIVERSITIES OF GUJARAT

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Fourth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) June-2015

PART-A : Objective

Course No.PBG 4.4 Course Title: Breeding Field/Horticulture Crops (2+1)

Date: 26.06.2015 Friday **Time: 9.30 to 10.15 hrs** **Marks: 40.00**

Marks obtained: ____/40 **Examiner Sign:_____**

Q.-1 Tick mark (V) most appropriate option from the following (40.0)

1. Which of the following is considered as "Wonder/Miracle Crop"?
   (a) Maize (b) Groundnut (c) Castor (d) Soyabean
2. Botanical name of marigold is
   (a) *Tagetes erecta* (b) *Tagetes esculenta*
   (c) *Gerbera jemesonii* (d) *Glycine max*
3. Polygamy i.e. several sex types reported in
   (a) Guava (b) Papaya (c) Banana (d) Aonla
4. Sunflower is considered as _____ crop.
   (a) Self Pollinated (b) Often-cross pollinated
   (c) Cross-pollinated (d) Vegetatively propagated
5. UPAS -120 and BDN-2 are the famous varieties of
   (a) Castor (b) Cotton (c) Green gram (d) Pigeonpea
6. Papain extracted from the unripe fruits of
   (a) Mango (b) Banana (c) Papaya (d) Aonla
7. Parents of castor hybrid GCH - 7 is
   (a) VP-1 X 48-1 (b) Geeta X SH-72
   (c) JP-65 X JI-96 (d) SKP-84 X SKI-215
8. Golden rice is developed for
   (a) Higher yield (b) Better nutritional quality
   (c) Earliness (d) Resistance against blast
9. Bt cotton hybrids have been developed against resistance to
   (a) Cotton Aphid (b) Cotton whitefly
   (c) Cotton mealy bug (d) Cotton bollworm
10. The inflorescence of sugarcane is known as
    (a) Arrow (b) Spikelets (c) Tassel (d) Spadix
11. Which of the following is incorrect pair?
    (a) Soyabean (2n=40) (b) Chickpea (2n=16) (c) Green gram (2n=22) (d) Black gram (2n=26)
12. CRRI is located at
    (a) Kanpur (b) Hyderabad (c) Cuttack (d) Karnal
13. The green leaves of sorghum plant contain
    (a) HCN (b) Gossypol (c) Tannin (d) Trypsin
14. The inflorescence of onion is known as
    (a) Spadix (b) Umbel (c) Arrow (d) Head

[P.T.O.]

15. The family of Chrysanthimum is
    (a) Asteraceae (b) Caricaceae (c) Rosaceae (d) Myrtaceae
16. Monopodia and sympodia branches classified in
    (a) Pigeonpea (b) Rose (c) Castor (d) Cotton
17. Pearl millet is cross pollinated crop due to
    (a) Protogyny (b) Cleistogamy (c) Protandry (d) Chasmogamy
18. Triticale is developed from a cross between ...
    (a) *Oryza sativa* X *T. aestivum* (b) *T. aestivum X Secale cereal*
    (c) *T. turgidum X T. aestivum* (d) *Avena sativa* X *T. aestivum*
19. The choice of breeding methods mainly depends on
    (a) Gene action (b) Breeding objective of crop
    (c) Mode of pollination (d) (a) + (b) + (c)
20. Pistillate line is used in hybrid seed production of
    (a) Pigeonpea (b) Castor (c) Sorghum (d) Cotton
21. The method used to transfer resistant gene from one species to another species is
    (a) Pedigree method (b) Back cross method
    (c) SSD method (d) Bulk method
22. Source of dwarfing gene in rice variety TN 1 is
    (a) Tomb Thomb (b) Norin 10
    (c) Dee-geo-woo-gen (d) Nelson dwarf
23. Chromosome number of a plant species can be doubled with the help of
    (a) Colchicine (b) Sodium azide
    (c) Nitrous Oxide (d) Aceto carmine
24. Centre of origin of mango is
    (a) Brazil (b) China (c) Sudan (d) Indo-Burma
25. Father of hybrid cotton is
    (a) N.E.Borlaug (b) Swaminathan (c) Y. L. Ping (d) C. T. Patel
26. Homogenous and heterozygous populations are examples of
    (a) Pure lines (b) F_1 Hybrids (c) Multi lines (d) Synthetics
27. Cleistogamy promotes
    (a) Self incompatibility (b) Male sterility
    (c) Self pollination (d) Cross pollination
28. Genome and chromosome number of bread wheat is
    (a) AACCDD (2n=42) (b) AACC (2n=28)
    (c) AABBDD (2n=42) (d) AAGG (2n=28)
29. AVRDC is situated in the country of
    (a) Egypt (b) Taiwan (c) Pakistan (d) Philippines
30. Botanical name of guava is
    (a) *Musa paradisica* (b) *Emblica officinalis*
    (c) *Mangifera indica* (d) *Psidium guajava*
31. Triticale is developed by
    (a) T. A. Edison (b) M. S. Swaminathan
    (c) W.Rimpu (d) N. E. Borlouge
32. Which florets are used as an adulterant in saffron?
    (a) Safflower (b) Kenaf (c) Sunflower (d) Soyabean
33. Doak's method of emasculation is used in
    (a) Sunflower (b) Cotton (c) Sugarcane (d) Castor
34. Aonla is rich source of
    (a) Vitamin -A (b) Vitamin -B_2 (c) Vitamin -C (d) Vitamin -D
35. In NBPGR, B stands for
    (a) Board (b) Bureau (c) Bank (d) Bureaucrats

On Page No –(3)

36. Gossypol found in cotton seed oil is responsible for
(a) Cancer (b) Kidney damage
(c) Thyroid enlargement (d) Human male sterility

37. Botanical name of kenaf is _____
(a) *Hibiscus rosa-sinensis* (b) *Hibiscus subderifa*
(c) *Hibiscus esculentus* (d) *Hibiscus cannabinus*

38. The term spadix is related to _____
(a) Rice (b) Maize (c) Sunflower (d) Castor

39. Quality protein maize contain high amount of _____
(a) Lysine (b) Tryptophan (c) Methionine (d) Both A and B

40. Wheat floret contains _____ anthers.
(a) 3 (b) 6 (c) 8 (d) 9

41. Bird resistance is specific breeding objective of
(a) Wheat (b) Rice (c) Sunflower (d) Pigeonpea

42. Triploid is necessary for the production of
(a) Resistance Breeding (b) Quality parameters
(c) Seedlessness (d) Earliness

43. Ragi contain higher amount of amino acid i.e.
(a) Methionine (b) Lysine (c) Tryptophane (d) Histidine

44. GMS based hybrid developed by China in sesame is
(a) Yeti No. 6 (b) Yeti No.7 (c) Yeti No. 8 (d) Yeti No. 9

45. World first GMS based hybrid in pigeonpea is
(a) ICPH-7 (b) ICPH-8 (c) ICPH-9 (d) GTH-1

46. Mustard variety developed by somaclonal variation is
(a) Pusa Kisan (b) Pusa Jay Kisan
(c) Pusa Sada Bahar (d) Pusa Nav Kisan

47. The outer most petals of pulse crop is known as
(a) Wing (b) Keel (c) Standard (d) All of above

48. Which is known as Queen of cereal
(a) Pearlmillet (b) Maize (c) Rice (d) Wheat

49. Tripsacum, a close relative of Zea is _____
(a) Monoecious (b) Diocious (c) Hermaphrodite (d) None

50. Chromosome number of okra is
(a) 120 (b) 130 (c) 90 (d) 60

51. CMS source for pearlmillet is
(a) Tift 23A (b) MS 25A (c) CK-60 (d) Milo

52. Johnson grass is the cross between
(a) *S. arundinaceum* x *S. propinquum* (b) *S. bicolor* x *S. halepense*
(c) *S. arundinaceum* x *S. halepense* (d) *S. bicolor* x *S. propinquum*

53. Resistant to striga is specific breeding objective of
(a) Sorghum (b) Safflower (c) Sunflower (d) Ragi

54. Which oilseed crop had high viscosity at high temperature?
(a) Groundnut (b) Mustard (c) Castor (d) Safflower

55. Mango plays an important part in the diet to its high content of
(a) Vitamin-A (b) Vitamin-B (c) Vitamin-C (d) Vitamin-E

56. Sesame seed contains _____ per cent oil
(a) 25-30 (b) 30-40 (c) 45-50 (d) 65-70

57. Bitter gourd is a.....plant.
(a) Monoecious (b) Dioecious (c) Bisexual (d) None

58. Various plant characters which promotes cross pollination are
(a) Dichogamy (b) Herkogamy (c) Heterostyly (d) All of above

59. Which of the following is a male reproductive organ in a flower?
(a) Sepal (b) Petal (c) Stamen (d) Carpel

60. Center of origin of castor is
(a) Abyssinia (Ethiopia) (b) Brazil and S.America (c) China (d) USA

61. Increasing level of aflatoxin is constraint in the export of
(a) Wheat (b) Castor (c) Groundnut (d) Sesame

62. Low seed multiplication ratio that is 1:5 is one of the bottlenecks in the spread of improved varieties of
(a) Maize (b) Castor (c) Groundnut (d) Mustard

63. Non-edible oil of castor is due to
(a) Ricin (b) Erucic acid (c) Gossypol (d) BOAA

64. Which oil has antioxidant and cholesterol reducing properties
(a) Sesame oil (b) Castor oil (c) Mustard oil (d) Cotton oil

65. *Helianthus annus* is the Botanical name of
(a) Sesamum (b) Safflower (c) Soybean (d) Sunflower

66. _____ is recommended for diabetic patient.
(a) Green gram (b) Chick pea (c) Pigeon pea (d) Black gram

67. The world's largest producer of sugar cane is
(a) India (b) China (c) Brazil (d) Phillipines

68. The cheapest and mostly used bast fibre in the world is
(a) Coconut (b) Jute (c) Cotton (d) Kenaf

69. Gluten is present in
(a) Pearl Millet (b) Rice (c) Wheat (d) Sorghum

70. _____ is a potential donor of genes for disease and insect resistance that may be used in improving maize.
(a) *Tripsacum* (b) *Teosinte* (c) *Pennisetum* (d) None

71. C_4 photosynthetic pathway is present in
(a) Ragi (b) Rice (c) Maize (d) Wheat

72. _____used in developing perennial fodder varieties in pearl millet.
(a) *P. squamulatum* (b) *P. orientale* (c) *P. setaceum* (d) *P. purpureum*

73. Which among the following is not often cross-pollinated crop?
(a) Cotton (b) Sorghum (c) Castor (d) Pigeonpea

74. Edible mustard oil is used with low content of
(a) Glucosinolate (b) Erucic acid (c) Both (a) and (b) (d) None

75. Center of origin of groundnut is
(a) South Africa (b) Brazil (c) China (d) India

76. NRC for onion and garlic is located at
(a) Rajendranagar (b) Rajgurunagar (c) Rajmundri (d) Raipur

77. Pearl millet flour is rancid due to high amount of
(a) Carbohydrates (b) Fats (c) Proteins (d) Vitamin-B_{12}

78. The centre of origin of tomato is
(a) Peru, Equador and Bolivia (b) Pakistan and Bolivia
(c) Nepal and Peru (d) India, Equador and Egypt

79. Botanical name of ridge gourd is
(a) *Luffa acutangula* (b) *Luffa cylindrica* (c) *Cucumis melo* (d) *Coccinia cordifolia*

80. Grand Naine, Robusta and Dwarf Cavendish are the varieties of
(a) Papaya (b) Guava (c) Aonla (d) Banana

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Fourth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) June-2015

PART-B : Subjective

Course No.PBG 4.4 **Course Title: Breeding Field/Horticulture Crops (2+1)**

Date: 26.06.2015 **Time: 10.15 to 12.00 hrs** **Marks: 40.00**

Friday

Q.1(A) Answer the following questions in brief (ANY SIX) **(6.0)**

1. Give fibre characteristics of cotton.
2. Narrates the reasons for low productivity of groundnut.
3. List out the types of flowers according to length of style in brinjal.
4. How selfing is carried out in bottle gourd?
5. Mention the quality parameters in wheat.
6. Give the name of two wild relatives of pigeonpea.
7. Write different methods of emasculation.

Q.1 (B) Describe the procedure involve in the commercial hybrid seed production of Castor OR Cotton. **(4.0)**

Q.2(A) Describe genetic origin of the following crops (ANY THREE) **(6.0)**

1. Hexaploid wheat
2. *Brassica* U's triangle
3. New world cotton
4. Groundnut

Q.2 (B) Define/explain the following (ANY EIGHT) **(4.0)**

1. Monoecious
2. Allopolyploids
3. Self incompatibility
4. Fuzz
5. Clone
6. Protandry
7. R line
8. Xenia effect
9. Detasseling
10. Top cross

Q.3(A) Write a short notes (ANY FOUR) **(6.0)**

1. Blooming patterns in castor
2. Bt- Cotton
3. Types of sex forms in papaya
4. Noblization in sugarcane
5. Types of sorghum

Q.3 (B) Differentiate the following(ANY FOUR) **(4.0)**

1. Indica and Japonica rice
2. Bunch and spreading groundnut
3. Determinate and indeterminate pigeonpea
4. GMS and CGMS
5. Vertical and horizontal resistance

[P.T.O.]

Q.4(A) Give the reasons of the followings (ANY SIX) **(6.0)**

1. Coconut breeding is difficult.
2. Flowering is undesirable in commercial sugarcane.
3. Knowledge of flower biology is essential for the plant breeders.
4. Flower appears above the ground but pod formation takes place below ground in groundnut.
5. Chickpea is a highly self pollinated crop.
6. Triticale is not accepted by the Indian farmers.
7. Maximum genetical and cyto-genetical studies are carried out in maize.
8. Maintenance of germplasm/gene pool is mandatory.

Q.4 (B) Enlist the specific breeding objectives of the crops (ANY FOUR) **(4.0)**

1. Mango
2. Maize
3. Coconut
4. Brinjal
5. Sesame
6. Onion

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Fifth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) December-2015

Part A: Subjective

Course No: PBG 5.5 **Title of Course: Principles of Seed Technology**
Date: 14/12/2015 **Time: 9.30 -12.00** **Marks: 40.0**
Day: *Monday*

Q.1 A Write Short Note (Any Three) **6.0**

1 Role and Goals of Seed Technology
2 Causes of deterioration of genetic purity
3 Activities of state seed certification agency
4 *Seed treatment*
5 Classes of seed

B Differentiate the following (Any Four) **4.0**

1 Sanctioned legislation *Vs* Control legislation
2 Seed *Vs* Grain
3 Nucleus *Vs* Certified seed
4 A line *Vs* R line
5 Genetic purity *Vs* Physical purity
6 Seed *Vs* Field inspection

Q.2 A Define / Explain (Any Five) **5.0**

1 Seed technology
2 Seed certification
3 Isolation distance
4 Electrophoresis
5. Off type
6. Patent
7. Variety
8. Seed marketing

B Give the full form of following **5.0**

1. ISST
2. PPV & FR
3. GSSCA
4. ODV
5. NSC
6. SSTL
7. AICRP
8. ISTA
9. CVRC
10. TRIPs

Q.3 A Justify the following statements (Any Five) **5.0**

1 Male sterility system is not much popular for hybrid seed production in maize.
2 Hand emasculation and pollination is popular in hybrid seed production of cotton .
3 Seed must be stored in cool and dry condition.
4 Castor and bajara require more isolation distance
5 History of seed plot is necessary for selection of seed production plot.
6 Variety must be distinct, uniform and stable.
7 Seed production programme should be taken up in its area of adaptation.

[P.T.O]

B Enlist the following (Any Five) **5.0**

1 Important safe guards to maintain genetic purity of variety
2 Characteristics of good seed
3 Important duties of seed inspector
4 Procedure of seed certification
5 Stages of seed inspection
6 Seed distribution channels in India
7 Factors affecting seed storage

Q. 4 **Explain the following steps in hybrid seed production of Cotton or Castor or Sorghum** **10.0**

1. Selection of seed plot and land preparation
2. Isolation distance , pollination method and seed rate
3. Spacing , row ratio and planting layout
4. Stages of rouging
5. Harvesting and seed standards

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University Seat No :		Centre:	
Registration No.:		Sign. of Supervisor:	
		Marks obtained:	

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Fifth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) December-2015

Part A: Objective

Course No: PBG 5.5 **Title of Course: Principles of Seed Technology**
Date : 14/12/2015 **Time: 9.30 -12.00** **Marks: 40.0**
Day: Monday

Q.1 Tick[√] mark appropriate answer from the following. **40.0**

1. **Genetic Purity of varieties is deteriorated by**
   a) Microbes b) Weed c) Insects d) Out Crossing
2. **Seed act was formulated and enacted during**
   a) 1967 and 68 b) 1966 and 69 c) 1967 and 1970 d) 1980 and 82
3. **Author of book "Principles of Seed Technology" is written by**
   a) R.L. Agarwal b) N.B. Patel c) P.K. Agarwal d) Khare and Bhale
4. **The term " Seed Technology" was defined by**
   a) Cowan b) Horne c) R.L. Agarwal d) Khare and Bhale
5. **Establishment of scientific seed industries in the country is the achievement of**
   a) CSC b) NSC c) ICAR d) SAUs
6. **Which of the following agency certify the seed in Gujarat?**
   a) ISTA b) GSSCA c) NSC d) GSSC
7. **Validity period of certified seed can be extended for _____**
   a) Three months b) Six months c) Twelve months d) Two years
8. **Breeder seed is the progeny of _____**
   a) Nucleus seed b) Foundation seed c) Certified seed d) Register seed
9. **Crop scientist has the power to issue tag of which class of seed?**
   a) Nucleus b) Breeder c) Foundation d) Certified
10. **Tag colour of foundation seed is**
    a) Blue b) White c) Golden yellow d) Green
11. **Isolation distance for certified seed production of bottle gourd is _____ meter.**
    a) 600 b) 800 c) 1000 d) 1500
12. **De-linting in cotton is done with _____**
    a) Acid b) Alcohol c) Distilled water d) Detergent
13. **Isolation distance for certified seed production of castor is _____meters.**
    a) 200 b) 300 c) 350 d) 400
14. **SKP-84 x SKI-215 are the parents of following hybrid**
    a) GCH-2 b) GCH-4 c) GCH-5 d) GCH-7
15. **ABR system of hybrid seed production is followed in**
    a) Castor b) Sunflower c) Cotton d) Okra
16. **Doddar (*Cuscuta refloxa*) is the objectionable weed in**
    a) Lucerne b) Mustard c) Chilli d) Okra
17. **Minimum seed certification standard for germination percentage in certified seed of cotton.**
    a) 60 b) 65 c) 70 d) 75
18. **Minimum seed certification standard for physical purity of sorghum certified seed is**
    a) 94 % b) 96 % c) 97 % d) 98 %

P.T.O.

19. Seed deterioration rate depends on
a) Temperature b) Moisture c) Space d) Seed quantity

20. ODV test for determination of genetic purity is on the basis of _____character.
a) Plant morphology b) Seed c) Flower d) Stem

21. The genetic purity in field is judged/tested by
a) GOT b) ODV c) PAGE d) TZ test

22. The head quarter of NSC is located at
a) Gandhinagar b) Hyderabad c) Mumbai d) New Delhi

23. The head quarter of UPOV is located at
a) Rome, Italy b) CIMMYT, Mexico c) Geneva, Switzerland d) Losbanos, Phillipines

24. The head quarter of GSSC is located at
a) Gandhinagar b) Rajkot c) Baroda d) Surat

25. Sex reversal is the problem in _____hybrid seed production.
a) Maize b) Castor c) Sorghum d) Sunflower

26. PGMS system of male sterility is utilized in hybrid seed production of _____
a) Maize b) Rice c) Cotton d) Sorghum

27. Detasseling is important operation is carried out in hybrid seed production of _____
a) Maize b) Castor c) Sorghum d) Sunflower

28. Male sterility is not famous in hybrid seed production of ____
a) Maize b) Pearl millet c) Sorghum d) Sunflower

29. Isolation distance for certified seed production in hybrid cotton is _____meters.
a) 20 b) 30 c) 40 d) 50

30. Maintenance of parents of hybrid seed is carried out under _____class
a) Truthful b) Certified c) Foundation d) Both a & b

31. Seed colouring is serves the purpose of
a) Warning b) Indication of seed treatment c) both a & b d) None of these

32. Which among the following gel is used for DNA finger printing in electrophoresis?
a) Agarose b) PAGE c) SDS-PAGE d) Native-PAGE

33. Destruction of surface born organisms on the seed surface is called as _____
a) Seed disinfection b) seed infection c) Seed cleaning d) Seed disinfestations

34. Instruments used for chemical seed treatment is _____
a) Scalper b) Huller c) Drum treater d) Scarifier

35. Basic seed cleaning is done by following instrument
a) Air screen cleaner b) Disc separator c) Gravity separator d) Mist-o-matic

36. In Bajara, 95555A is ____line.
a) A line b) B line c) R line d) Pistillate line

37. Removal of off type plant is known as
a) Emasculation b) Rouging c) Plot supervision d) Seed inspection

38. Example of chemical hybridizing agent for introducing male sterility is
a) IAA b) GA_3 c) Malic hydrazide d) Ethylene

39. The standard method for moisture estimation is
a) Moisture meter b) Toluene method c) P_2O_5 method d) Oven dry method

40. Staggered planting is carried out for
a)Synchronization of flowering b) Synchronization of plant maturity c) Maintenance of plant population d) Maintenance of isolation

41. In hybrid seed production of castor female:male ratio is
a) 5:1 b) 4:1 c) 2:3 d) 2:2

42. Period of protection of variety as per PBR is
a) 7 years b) 10 years c) 15 years d) 25years

43. The causes responsible for loss of genetic purity during seed production were given by
a) Kale b) Kadam c) Khare &Bhale d) Dewey & Lu

44. Unwanted plants growing from residual seeds of previous crop remaining in the field is known as
a) Volunteer plant b) Rouge plant c) Weed Plant d) Objectionable Weed

45. ISTA is short form of
a) Indian Seed Testing Association b) International Seed Testing association c) Indian Seed Testing Academy d) International Seed Testing Agency

46. ISST publish news letter entitled as____
a) Seed Technology news b) Seed Science and Technology news c) Seed Research d) Seed Science news

47. Tag colour of nucleus is ____
a) Golden Yellow b) Blue c) White d) None of these

48. Primary seed processing is
a) Grading b) Seed cleaning c) Seed drying d) Seed Treatment

49. An idea, design, an invention, a manuscript etc which can ultimately give rise to a product /application
a) IPR b) PBR c) PVA d) PPV &FR

50. Row ratio of Female : Male in hybrid seed production of bajara is
a) 4:1 b) 4:2 c) 2:4 d) 1:4

51. A variety is notified by
a) CVRC b) SVRC c) AICRP d) AGRESCO

52. Foundation seed is progeny of __
a) Nucleus seed b) Truthful Seed c) Breeder seed d) Certified Seed

53. Bag/packet weight of certified seed of cotton is __g
a) 450 b) 500 c) 650 d)700

54. In Gujarat, seed testing laboratory is located at
a) Junagadh b) Anand c) SK Nagar d) Bardoli

55. Genetic purity of variety is maintained by
a) Isolation distance b) Rouging c) Plant protection d) Both a & b

56. Doak's method of hybrid seed production is used in ___
a) Castor b) Cotton c) Sunflower d) Rice

57. Isolation distance depends on
a) Mode of Pollination b) Pollination vector c) Breeding system d) All of these

58. Regulation of seed quality control in market is done by
a) Police inspector b) Seed inspector c) Seed testing officer d) Seed officer

59. Farmers can produce following classes of seed
a) Breeder b) Certified c) Foundation d) Both b &c

60. Ginning operation is carried out in _
a) Castor b) Cotton c) Sunflower d) Okra

61. Pollen shedders are rouged out from following line _
a) A line b) B line c) R line d) Both b & c

62. Seed Viability test is carried out by
a) ELISA b) TZ test c) GOT d) PAGE

63. Restorer line is maintained by_____ in isolation.
a) Selfing b) Crossing c) Sibbing d) A X R

64. The example of carrier of new technology is _
a) Bt cotton b) Golden rice c) Both a & b d) Hybrid okra

65. B line is maintained by
a) Cross with pistillate line b) Cross with A line c) Cross with R line d) Selfing

66. Isolation distance for breeder seed production of female line in castor
a) 500m b) 1000 m c) 600m d) 800m

67. The equipment which is used to scratches hard seed coat to improve process of germination is
a) Debearder b) Scarifier c) Shellar d) Huller

68. Which of the following is not an authentic seed?
a) Labelled seed b) Foundation seed c) Certified seed d) Breeder seed

69. Rope pulling method of supplementary pollination is used in
a) Maize b) Sunflower c) Rice d) Chilli

70. In hybrid seed production, hybrid seed is harvested from
a) A line b) B line c) R line d) Both a & b

71. Which of the following is not a physical purity component?
a) Pure seed b) Inert matter c) Weed seed d) Germination

72. First AICRP was initiated in __
a) Castor b) Groundnut c) Maize d) Rice

73. _____ is mother of all classes of seed
a) Nucleus Seed b) Breeder seed c) Foundation seed d) Certified seed

74. Seed grading is done through
a) Huller b) Thresher c) Seed sheller d) Specific gravity separator

75. _____ is the cheapest method of seed drying
a) Sun drying b) Forced air drying c) Heated air drying d) Simple air drying

76. Carry over seed is stored for a period of _____ month
a) Six b) Twelve c) Eighteen d) Twenty four

77 Farmer has to replace the seed every year for the ____ varieties
a) Pure line b) Hybrid c) Composite d) Synthetic

78 Objectionable weed in sorghum is _____
a) Orobanche b) Striga c) Doddar d) Lemon Grass

79. Seed meant for general distribution to farmers for commercial crop production refers to
a) Foundation seed b) Breeder seed c) Registered seed d) Certified Seed

80. The seed technologist having knowledge of
a) Plant Breeding b) Genetics c) Plant Pathology d) All of these

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Uni. Seat No.:_____

GUJARAT AGRICULTURAL UNIVERSITIES

1. Anand Agricultural University, Anand
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Sixth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) June-2015

PART-B (Subjective)

Course No.PBG 6.6 **Title of course: Principles of Plant Biotechnology (2+1)**

Date: 30.06.2015 **Time: 10.15 to 12.00 hrs** **Marks: 40.00**

Q.1 (A) Define / Explain the following (ANY EIGHT) **(4.0)**

1. Caulogenesis
2. Cybrid
3. Gene cloning
4. Haploid
5. Palindrome sequence
6. Micropropagation
7. Probe
8. Shuttle vector
9. Subculture
10. Totipotency

(B) Write the full form of the following (ANY TEN) **(2.0)**

1. RFLP
2. Et Br
3. PAGE
4. PEG
5. IBA
6. HEPA
7. dNTP's
8. GMO
9. GEAC
10. SSR
11. Ti Plasmid
12. pUC

(C) Differentiate between the following (ANY FOUR) **(4.0)**

(1) Auxin *Vs* Cytokinin
(2) cDNA *Vs* Genomic library
(3) Plant breeding *Vs* Transgenic breeding
(4) Southern blotting *Vs* Northern blotting
(5) Phenotypic marker *Vs* DNA marker

Q.2 (A) What is somatic hybridization? Explain somatic hybridization/ protoplast fusion with the help of schematic diagram. Give its applications in crop improvement. **(5.0)**

OR

Explain haploid production by anther and microspore culture with help of suitable illustrations. State the factors affecting of it.

(B) Give scientific reasons for the following (ANY FIVE) **(5.0)**

1. Osmoticums are added during protoplast isolation.
2. Regular subculture is required for plant tissue culture.
3. Leaf tissue is most suitable source for protoplast isolation.
4. Ideal pH for plant tissue culture is 5.5 - 5.8.
5. Callusing is undesirable for micropropagation.
6. *Taq*DNA polymerase is used in PCR.
7. Type-II restriction enzymes are widely used in molecular breeding.

Q.3 (A) What do you mean by PCR? Explain principle, procedure and applications of PCR **(5.0)**

OR

What are markers? Classify them and list out the molecular markers. Mention the ideal properties of DNA markers.

(B) Do as directed (ANY FIVE) **(5.0)**

1. Basis of somaclonal variation
2. *List out applications of plant tissue culture*
3. Enlist ideal properties of vectors
4. Give the components of gene cloning
5. Describe problems associated with micropropagation
6. Mention applications of genetic engineering
7. Enlist the DNA modifying enzymes used in rDNA technology

Q.4 Write short notes on the following (ANY FOUR) **(10.0)**

1) Artificial seed
2) Embryo culture
3) Marker assisted selection
4) Gene transformation
5) Somaclonal variation

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Registration No:_____	Uni. No:_____
Center: _____	Signature: _____

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Sixth Semester B.Sc. (Hons.) Agri. (Supplementary) End Examination 2014-15

PBG 6.6 : Principles of Plant Biotechnology (2+1)

"PART-B (Subjective)"

Date: 08.01.2015 **Time: 10.15 to 12.00 hrs**

Day : Thursday **Marks: 40.00**

Q.1 (A) Define / Explain the following **(Any Eight)** **4.0**

1. Sterilization
2. Callus
3. Androgenesis
4. Protoplast
5. Organogenesis
6. Biotechnology
7. Transformation
8. Primer
9. Restriction enzyme
10. Electrophoresis

Q.1 (B) Write the full form of the following **(Any Ten)** **2.0**

1. AFLP
2. T-DNA
3. IAA
4. BAC
5. BSA
6. RNA
7. cDNA
8. PCR
9. MAS
10. RAPD
11. PAGE
12. GA_3

Q.1 (C) Differentiate the following **(Any Four)** **4.0**

1. RAPD Vs. AFLP
2. Somatic embryogenesis Vs. Embryo culture
3. Anther culture Vs. Ovary culture
4. Direct Vs. Indirect methods of gene transfer
5. Sourthern blotting Vs. Northern blotting
6. Redifferentiation Vs. Dedifferentiation

Q.2 (A) Explain somatic embryogenesis with schematic representation along with its applications **5.0**

OR

Discuss micropropagation in detail along with its applications, advantages and disadvantages

Q.2 (B) Give scientific reason for the following **(Any Five)** **5.0**

1. Androgenesis is widely used as compared to gynogenesis
2. Type II restriction enzymes are widely used for gene cloning
3. Embryo abortion is observed during wide hybridization
4. Codominant markers are preferred over dominant markers
5. Sterilization is inevitable in any tissue culture experiment
6. *Agrobacterium* mediated gene transfer method is most widely used
7. DNA markers are advantageous over morphological markers

(P.T.O.)

Q.3 (A) Give brief answers **(Any Five)** **5.0**

1. Enlist different types of cloning vectors
2. Applications of gynogenesis
3. Enlist factors affecting electrophoresis
4. Stages of micropropagation
5. Enlist different gene transfer methods
6. Causes of somaclonal variation
7. Problems associated with anther culture

Q.3 (B) What is a molecular marker ? Explain any one molecular marker technique along with its applications, advantages and disadvantages **5.0**

OR

What is PCR ? Give components of PCR reaction and discuss its steps along with the applications.

Q.4 Write short notes on following **(Any Four)** **10.0**

1. Applications of tissue culture in crop improvement
2. Recombinant DNA technology
3. Meristem culture
4. Marker assisted selection
5. Synthetic seed
6. *Agrobacterium* mediated plant transformation

Registration No:_____	Uni. No:_____
Center: _____	Signature: _____

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Sixth Semester B.Sc. (Hons.) Agri. (Supplementary) End Examination 2014-15

PBG 6.6 : Principles of Plant Biotechnology (2+1)

"PART-A (Objective)"

Date: 08.01.2015 **Time: 9.30 to 10.15 hrs**

Day : Thursday **Marks: 40.00**

Q.1 Under line or Tick mark (√) the most appropriate answer **(20)**

1. _____ is the ability of plant cells to regenerate into whole plant
   a) Totipotency b) Plasticity
   c) Flexibility d) None of these
2. Direct induction and regeneration of shoot and root from explants is known as
   a) Organogenesis b) Somatic embryogenesis
   c) Protoplast fusion d) Somaclonal variation
3. Development of embryos from somatic cell is
   a) Embry culture b) Protoplast isolation
   c) Somatic embryogenesis d) None of these
4. The encapsulated somatic embryos are known as
   a) Synthetic seed b) Certified seed
   c) Natural seed d) None of these
5. The ploidy level of haploid is
   a) 2n b) 3n
   c) n d) 4n
6. Which of the following agent is used for chromosome doubling
   a) Sodium Chloride b) Colchicine
   c) Alcohol d) Mercury chloride
7. Production of haploids from ovary and ovule is known as
   a) Androgenesis b) Somatic embryogenesis
   c) Gynogenesis d) Micropropagation
8. _____ receives nucleus from both the parents and cytoplasm from one parent
   a) Vybrid b) Cybrid
   c) Hybrid d) Somatic hybrid
9. Which of the following is utilized to know the biochemical and physiological changes during fruit development
   a) Ovary culture b) Anther culture
   c) Microspore culture d) Protoplast culture
10. _____ is utilized to avoid post fertilization barrier
    a) Embryo culture b) Somaclonal variation
    c) Pollen culture d) Protoplast isolation
11. Application of electric current for protoplast fusion is known as
    a) Electroporation b) Electrofusion
    c) Microinjection d) Electrophoresis
12. _____ is used to produce triploid plants
    a) Embryo cultue b) Endosperm culture
    c) Pollen culture d) None of these
13. _____ is the variation observed among the plants regenerated from cultured gametic cells
    a) Somaclonal variation b) Somatic variation
    c) Gametoclonal variation d) None of these

(P.T.O.)

14. Which of the following hormone is utilized for induction of root
   a) Auxin b) Ethylene
   c) Cytokinin d) Gibberellins
15. A cell without cell wall is known as
   a) Protoplast b) Nucleoplast
   c) Cytoplast d) Chloroplast
16. Which of the following is utilized for protoplast fusion
   a) PEG b) Electrofusion
   c) Sodium nitrate d) All of these
17. _____ is the genetic material present in prokaryotes and eukaryotes
   a) DNA b) RNA
   c) Protein d) None of these
18. _____ is the father of plant tissue culture
   a) Skoog b) Murashige
   c) Haberlandt d) Watson
19. Molecular scissor which cuts DNA is known as
   a) Nuclease b) Proteinase
   c) Ligase d) None of these
20. Net charge of the DNA molecule is
   a) Positive b) Negative
   c) Neutral d) All of these
21. _____ invented Polymerase Chain Reaction
   a) Kary Mullis b) Watson and Crick
   c) Gregor Mendel d) Haberlandt
22. Separation of two DNA strands is known as
   a) Extension b) Denaturation
   c) Annealing d) Amplification
23. Which of the following is widely utilized for rapid production of homozygous lines
   a) Protoplast fusion b) Anther culture
   c) Ovary culture d) Embryo culture
24. Movement of charged particle under electric current is known as
   a) Electrofusion b) Electrophoresis
   c) Electroporation d) None of these
25. Which of the following affects sample migration under electrophoresis
   a) Sample factors b) Buffer
   c) Supporting medium d) All of these
26. Which of the following is utilized as vector
   a) Plasmid b) Cosmid
   c) Bacteriophage d) All of these
27. _____ restriction enzymes are widely utilized for gene cloning experiments
   a) Type I b) Type II
   c) Type III d) None of these
28. Uptake of nacked DNA by plant cell is known as
   a) Transformation b) Transduction
   c) Conjugation d) Transfection
29. Which of the following markers are most accurate
   a) Morphological b) Biochemical
   c) Cytological d) DNA markers
30. Which of the following marker utilizes restriction enzymes
   a) SSR b) RFLP
   c) RAPD d) None of these
31. Polymerase chain reaction includes
   a) Denaturation b) Annealing
   c) Extension d) All of these
32. Denaturation step of PCR leads to _____ of two DNA strands
   a) Separation b) Joining
   c) Renaturation d) None of these

33. Which of the following is utilized as mapping population
   a) Recombinant Inbred Line b) Doubled haploids
   c) Near Isogenic Line d) All of these
34. QTL analysis deals with _____ traits
   a) Qualitative b) Quantitative
   c) Both (a) and (b) d) None of these
35. _____ are the autonomous, double stranded circular DNA molecules present in bacteria
   a) Plasmids b) Cosmids
   c) Phasmids d) None of these
36. Which of the followings is artificial chromosome
   a) BAC b) YAC
   c) HAC d) All of these
37. _____ is the piece of labeled DNA molecule utilized to find out complementary DNA sequence
   a) Probe b) Primer
   c) Recombinant DNA d) None of these
38. Transfer of nucleic acid fragments from gel to nitrocellulose or nylon membrane is known as
   a) Hybridization b) Labeling
   c) Blotting d) Probing
39. Which of the following is direct method of gene transfer
   a) Microinjection b) Particle bombardment
   c) Electroporation d) All of these
40. The complementary DNA obtained from RNA molecules is known as
   a) cDNA b) tDNA
   c) rDNA d) None of these

Q.2 Fill in the blanks **(10)**

1. Higher auxin : cytokinin ratio favours _____ growth in tissue culture. (Shoot, Root, Callus)
2. _____ culture technique is used to get virus free plant. (Meristem, Embryo, Ovary)
3. Removal of microorganism is known as _____ (Contamination, Sterilization, Fermentation)
4. _____ is used as gelling agent in tissue media (PEG, Colchicine, Agarose)
5. _____ blotting technique is used for DNA (Western blotting, Southern blotting, Northern blotting)
6. Undifferentiated mass of the cell is known as _____ (Callus, Protoplast , Embryoids)
7. Denaturation step of PCR is carried out at _____ °C temperature (72, 94, 55)
8. Regeneration of haploid plant from anther and pollen is known as _____ (Androgenesis, Gynogenesis, Somatic embryogenesis)
9. Induction and regeneration of shoot from callus is known as _____ (De-differentiation, Re-differentiation, Callus formation)
10. _____ culture consists of cell aggregates dispersed and growing in moving liquid media (Suspension, Protoplast, Embryo)

Q.3 Match the following using the appropriate answer from B **(10)**

Group A	Answer from Group B		Group B
1. Vectors	[ ]	a.	Induction of shoot/root
2. Western blotting	[ ]	b.	Ti plasmid
3. Organogenesis	[ ]	c.	Gene cloning
4. Protoplast isolation	[ ]	d.	Dominant marker
5. *Agrobacterium tumefaciens*	[ ]	e.	DNA amplification
6. Northern blotting	[ ]	f.	Cellulase
7. RFLP	[ ]	g.	Protein
8. RAPD	[ ]	h.	RNA
9. PCR	[ ]	i.	Ri-plasmid
10. *Agrobacterium rhizogenes*	[ ]	j.	Codominant marker

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Uni. Seat No:_____ **Centre:** _____

Registration No:_____ **Supervisor Sign:**_____

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Sixth Semester End Examination of B.Sc. (Hons.) Agriculture (Regular) June-2015

PART-A (Objective)

Course No.PBG 6.6 **Title of course: Principles of Plant Biotechnology (2+1)**

Date: 30.06.2015 **Time: 9.30 to 10.15 hrs** **Marks: 40.00**

Marks obtained: ____ /40 **Examiner 's Sign:**_____

Q.-1 Tick mark (√) most appropriate option from the following **(40.0)**

1. **Reverting of callus cells to meristematic state is known as**
   (a) Regeneration (b) De-differentiation
   (c) Re-differentiation (d) All of these
2. **The cell devoid of cell wall and nucleus is known as**
   (a) Cytoplast (b) Protoplast
   (c) Cytome (d) Chloroplast
3. **Somaclonal variety of Indian mustard is**
   (a) Pusa Kiran (b) Pusa Bold
   (c) Varuna (d) Pusa Jaikishan
4. **Gene gun method is also known as**
   (a) Electroporation (b) Particle bombardment
   (c) Agrobacterium mediated (d) Microinjection
5. **Hyper hydration/vitrification problem is associated with**
   (a) Micropropagation (b) Pollen culture
   (c) Embryo culture (d) Ovule culture
6. **Encapsulation of somatic embryo is required in case of**
   (a) Non-zygotic seed (b) Synthetic seed
   (c) Artificial seed (d) All of these
7. **In case of protoplast fusion, which of the following stages are in correct sequence**
   (a) Agglutination → Membrane fusion →Rounding off of protoplast
   (b) Rounding off of protoplast →Membrane fusion → Agglutination
   (c) Membrane fusion→Rounding off of protoplast →Agglutination
   (d) Membrane fusion → Agglutination → Rounding off of protoplast
8. **The ploidy level of diploid is**
   (a) 4n (b) n
   (c) 2n (d) 3n

9. **The production of haploid can be done by**
   (a) Chromosome elimination (b) Chromosome doubling
   (c) Double fertilization (d) All of these
10. **Application of electric current for protoplast fusion is known as**
   (a) Microinjection (b) Electrophoresis
   (c) Electroporation (d) None of these
11. **Which of the following favors root induction in tissue culture?**
   (a) Equal Auxin to Cytokinin ratio (b) High Auxin to Cytokinin ratio
   (c) Low Auxin to Cytokinin ratio (d) High Cytokinin to Auxin ratio
12. **The progeny regenerated from tissue cultured plantlets is denoted as**
   (a) R_0 (b) R_1
   (c) R_3 (d) R_2
13. ***Invitro* amplification of DNA is done by**
   (a) Polymerase Chain Reaction (b) Polymerase Chain Reduction
   (c) Gel documentation system (d) Gel electrophoresis
14. **Spontaneous fusion of protoplasts often produces**
   (a) Homokaryon (b) Heterokaryon
   (c) Vybrid (d) Both (a) and (b)
15. **Production of first haploid plant from pollen grain of datura by**
   (a) Maheshwari and Rangaswamy (1958) (b) Reinert and steward (1959)
   (c) Guha and Maheshwari (1964) (d) Tulecke (1953)
16. **Pomato is an example of**
   (a) Hybrid (b) Vybrid
   (c) Dybrid (d) Somatic hybrid
17. **Virus free plantlets can be produce through**
   (a) Stem cutting (b) Meristem culture
   (c) Organ culture (d) Microspore culture
18. **Polarity of somatic embryo is**
   (a) Multipolar (b) Monopolar
   (c) Bipolar (d) All of these
19. **Embryo rescue technique helps to overcome**
   (a) Post-fertilization barrier (b) Vitrification
   (c) Browning problem (d) Pre-fertilization barrier
20. **The development of a structure from an unorganized state to differentiated and organized state**
   (a) Dedifferentiation (b) Totipotency
   (c) Morphogenesis (d) All of these
21. **The formation of embryos from callus or somatic embryo is known as**
   (a) Parthenogenetic (b) Indirect embryogenesis
   (c) Direct embryogenesis (d) None of these
22. **Seed propagation of sterile plant is possible through**
   (a) Pollen culture (b) Ovary culture
   (c) *Invitro* fertilization (d) Synthetic seed
23. **Browning in plant tissue culture media occurs due to**
   (a) Polyphenols (b) Sugar
   (c) Vitamins (d) Charcoal
24. **Mechanical method of protoplast isolation is suitable for**
   (a) Mature tissue (b) Highly vacuolated cell
   (c) Meristematic tissue (d) All of these
25. **Which of the following is widely used as osmoprotectant?**
   (a) Mannitol (b) DMSO
   (c) Glucose (d) Raffinose

[To page No. 3]

26. **High sucrose level acts as _____ in pollen culture medium**
(a) Diffusion (b) Plasmolytic
(c) Osmolytic (d) Osmoregulator

27. **The tendency of callus cells to separate easily is known as**
(a) Friability (b) Hybridity
(c) Callusing (d) Granulation

28. **Fertilized ovule culture will produce**
(a) Haploid (b) Diploid
(c) Triploid (d) Tetraploid

29. **Agar is isolated from**
(a) Bacteria (b) Yeast
(c) Weed (d) Algae

30. **The enzyme which is used for joining DNA fragment is called**
(a) S1 Nuclease (b) Nuclease
(c) Ligase (d) DNA polymerase

31. **Restriction endonucleases are also known as**
(a) Molecular scissor (b) Scalpel
(c) knives (d) Cutter

32. **Which of the following blotting method is used for protein?**
(a) Southern (b) Northern
(c) Western (d) Eastern

33. **Which of the following is not a direct transformation technique?**
(a) Agrobacterium mediated (b) Microinjection
(c) Electroporation (d) Microprojectile

34. **Annealing step of PCR involves**
(a) Separation of two strands (b) Rearrangement of DNA
(c) Joining of primer to complimentary strand (d) Super coiling

35. **Extension step of PCR occurs at which temperature?**
(a) 90 °C (b) 72 °C
(c) 60 °C (d) 94 °C

36. **Which of the following is not used for DNA finger printing**
(a) RAPD (b) RFLP
(c) SSR (d) Blotting

37. **Short single stranded oligonucleotide that is used for DNA amplification in PCR is**
(a) cDNA (b) Primer
(c) QTL (d) Probe

38. **The enzyme reverse transcriptase is generally obtained from**
(a) Mycoplasma (b) Fungi
(c) Virus (d) Bacteria

39. **The technique used to separate DNA fragments is**
(a) Southern blotting (b) Gel electrophoresis
(c) SSR (d) PCR

40. **Which of the following gas is used in microprojectile method?**
(a) Carbon dioxide (b) Helium
(c) Nitrogen (d) Oxygen

41. **PEG is used in which of the following gene transfer methods?**
(a) Microinjection (b) Biolistic
(c) Electroporation (d) Chemical mediated

42. **Recognition sequence of HindIII is**
(a) 5' GAATTC 3'
3' CTTAAG5'
(b) 5' AGCT 3'
3' TCGA 5'
(c) 5' AAGCTT 3'
3' TTCGAA 5'
(d) 5' TCGA 3'
3' AGCT 5'

43. **Which of the following is not a PCR based marker?**
(a) RAPD
(b) RFLP
(c) SSR
(d) ISSR

44. **Golden rice is a good source of**
(a) Vit-A
(b) Amino acid
(c) Vit-B
(d) Starch

45. **Non coding sequence of gene is called**
(a) Recon
(b) Exon
(c) Muton
(d) Intron

46. **The cloning capacity of BAC vector is**
(a) 75-300kb
(b) 400kb
(c) 400-3000 kb
(d) 400-1000 kb

47. **Restriction enzymes protect bacterial DNA by the process of**
(a) Methylation
(b) Super coiling
(c) Addition of OH group
(d) Acetylation

48. **Vector having common characteristics of both Phage and plasmid is**
(a) pUC 18
(b) YAC
(c) Phagemid
(d) pBR322

49. **Net charge of DNA molecule is**
(a) Positive
(b) Negative
(c) Neutral
(d) none of these

50. **Which of the following is utilized as mapping population?**
(a) Backcross
(b) Recombinant Inbred Line
(c) Near Isogenic Line
(d) All of these

51. **Transfer of nucleic acid fragment from gel to nitrocellulose or nylon membrane is known as**
(a) Labelling
(b) Probing
(c) Blotting
(d) Hybridization

52. **The complementary DNA obtained from RNA molecules is known as**
(a) cDNA
(b) tDNA
(c) rDNA
(d) RNA

53. **The DNA is visualized after electrophoresis under U.V. radiation due to**
(a) Bromophenol blue
(b) Tris HCL
(c) Chloromphenicol
(d) Ethidium bromide

54. **Which part of the Agrobacterium is transferred in the host plant cells**
(a) *Vir* region
(b) T-DNA
(c) Resistance gene region
(d) Opine gene region

55. **The most common carbon source used in plant tissue culture media is**
(a) Fructose
(b) Sucrose
(c) Glucose
(d) Galactose

56. **Gynogenesis term is related to**
(a) Embryo
(b) Unfertilized ovule
(c) Microspore
(d) Pollen

57. **The culture used for triploid production is**
(a) Pollen
(b) Endosperm
(c) Embryo
(d) Ovary

[On page No. 5]

58. **Shoot proliferation from callus is promoted by**
(a) IAA/NAA (b) BAP/BA
(c) GA_3 (d) ABA

59. **Which of the following is a thermo *labile compound***
(a) *Plant growth regulators* (b) Agar
(c) *Charcoal* (d) Micronutrients

60. **When somaclonal variation is not heritable, it is called**
(a) Epigenetic (b) Genetic
(c) Calliclonal (d) Protoclonal

61. **Synthetic seeds are encapsulated by the chemical**
(a) Agar (b) Ca-Alginate
(c) Polypropylene (d) Wax

62. **Which of the following is not a plant tissue culture nutrient medium**
(a) MS (b) Gamberg
(c) B5 (d) S9

63. **The hormone 'Kinetin' was discovered by**
(a) Melchers *et al.* (b) Miller *et al.*
(c) Power (d) Braun

64. **The term biotechnology was coined by**
(a) Kary Mullis (b) Volchting
(c) Webber (d) Karl Ereky

65. **The meristem culture technique is developed by**
(a) Morel and Martin (b) Murashige
(c) Webber (d) Redenbergh

66. **The techniques used to save immature embryo from abortion**
(a) *Embryo rescue* (b) Ovary culture
(c) *Somatic culture* (d) Ovule culture

67. ***Excised plant portion* used to initiate plant tissue culture**
(a) Callus (b) Medium
(c) Explant (d) Cybrid

68. **Who used enzyme for protoplast isolation first time**
(a) Takebe *et al* (b) Cocking *et al*
(c) White (d) Kranz *et al*

69. **The restriction endonucleases were discovered by**
(a) Sharp and Robert (b) Hedertberg and Meselon
(c) Smith and Nathans (d) Temin and Baltimore

70. ***Bam*HI is belong to which category of Restriction enzyme**
(a) Type-III (b) Type-I
(c) Type-II (d) Type-IV

71. **Restriction endonucleases having identical recognition sequence but different cleavage sites are called**
(a) Schizomers (b) Isoschizomers
(c) Neomers (d) Neoschizomers

72. **Which of the following is DNA modifying enzyme ?**
(a) S1 Nuclease (b) Cellulase
(c) Protease (d) RNAse

73. DNA ligase joins two DNA molecules by formation of which bond

(a) Peptide (b) Disulphide

(c) Phosphodiester (d) Hydrogen bond

74. The largest size of DNA fragment can be accommodated in

(a) Phagemids (b) Plasmid

(c) Cosmids (d) YAC

75. Transgenic for male sterility-fertility mainly concerned with which genes?

(a) Cry-II (b) Cry-I

(c) Barnase and Barstar (d) Cry-IAc

76. The *Cry*-I protein are insecticidal to

(a) *Lepidopteran* insect (b) *Dipteran* insect

(c) *Coleopteran* insect (d) Both A and B

77. The enzyme reverse transcriptase was discovered by

(a) Temin and Baltimore (b) Maxam and Gilbert

(c) Smith and Nathan (d) Sharp and Robert

78. The process of removal of non-coding sequence from mRNA is

(a) RNA editing (b) Capping

(c) Tailing (d) Splicing

79. Which of the following dye is used as tracking dye during electrophoresis?

(a) Ethidium bromide (b) Tris HCL

(c) Chloromphenicol (d) Bromophenol blue

80. Region or locus on the chromosome associated with the expression of a quantitative trait is called as

(a) BIM (b) MCS

(c) Intron (d) QTL

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NAVSARI AGRICULTURAL UNIVERSITY
N. M. COLLEGE OF AGRICULTURE
Eighth Semester B. Sc. (Hons.) Agri. End Examination (New) (Regular)

PART A

Course No: PBG 8.11 (1+2) **Title:** Bio Informatics

Date: 08-06-2015 **Time:** 10.00-10.45

Day: Monday **Total Marks:** 40.00

Registration No.:	**University seat no.: .....**

Q.1.	Tick mark the correct answer (Any Ten)	[10]

1. The Transmission Control Protocol (TCP) and the Internet Protocol (IP) was introduced by
   a. ARPA c. Internet
   b. BITNET d. WWW
2. In computer storage of nucleic acid sequence the symbol H means
   a. A, G or T not C c. A, G or C not T
   b. A, C or T not G d. None of above
3. The tool used for standalone submission of data to NCBI is
   a. SAKURA c. BANKIT
   b. WEBIN d. SEQUIN
4. The one letter symbol for Glutamic acid is
   a. D c. G
   b. E d. U
5. The protein sequence determined by computerize translation of previously known DNA sequence is presented in
   a. Primary data base c. Composite data base
   b. Secondary data base d. Structural data base
6. In database, sequence records are not presented in a format
   a. Fasta c. XML
   b. ASN d. ABM
7. Which is a search engine
   a. Lynx c. Window Xp
   b. Muscle d. Google
8. This is the protein structure database
   a. PIR c. TrEMBL
   b. PDB d. SWISS PROT
9. In database, sequence records are stored in default format
   a. Fasta c. XML
   b. ASN d. ABM
10. Which is a tool used for PSA
    a. ClustalW c. Muscle
    b. T- Coffee d. BLAST
11. The search engine of NCBI is
    a. Entrez c. Google
    b. Mozilla d. BLAST
12. which is not a tool used for MSA
    a. ClustalW c. Muscle
    b. T- Coffee d. BLAST

Q. 2	Fill the following blanks (Any Twenty)	[20]

1. The default scoring matrix used by BLAST is .....
2. ..... is the tool used for gene specific primer designing.
3. The tool used for phylogenic tree preparation of sequence data is.....
4. The web based tool for SSR finding and primer designing is .....
5. The tool used for identification of RE digestion sites in sequence is.....
6. The software used for gene prediction in euckaryotes is .....
7. The local sequence alignment method is developed by.....
8. In fasta format the first line always start with ..... sign.
9. ....., ... and ..... are the members of international nucleotide database collaboration.
10. ..... and ..... are commonly used techniques for structure determination.
11. ..... is a cost for introducing gaps into the alignment, corresponding to insertions or deletions in the sequences
12. ..... and ..... are the techniques used for detection of SNP in the wet lab.
13. The term Phylogenetics came from Greek work ..... and ..... .
14. ..... and ..... are commonly used software for molecular marker data analysis.
15. ..... is the tool used for validating primers.
16. ..... is used as DNA signature of Bacteria.
17. ..... is used as DNA signature of Fungus.
18. ..... is tool used for Docking.
19. ..... and ..... are main types of rational drug designing.
20. ..... is method used for evaluating phylogeny tree.
21. The global sequence alignment method is developed by.....
22. The web based tool for MSA is .....

Q.3.	Write down the full form of following abbreviation (Any Ten)	[10]

1. BLOSUM : .....
2. EMBL : .....
3. PAM : .....
4. PDB : .....
5. BLAST : .....
6. SCOP : .....
7. html : .....
8. KEGG : .....
9. PSA : .....
10. UPGMA : .....
11. PCR-RFLP :.....
12. rcsb : .....

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NAVSARI AGRICULTURAL UNIVERSITY
N. M. COLLEGE OF AGRICULTURE
Eighth Semester B. Sc. (Hons.) Agri. End Examination (New) (Regular)
PART B

Course No: PBG 8.11 (1+2) **Title:** Bio Informatics

Date: 08-06-2015 **Time:** 10.45-12.30
Day: Monday **Total Marks:** 40.00

Q.1. Define / Explain : (Any Ten) **[10]**

1. Ab Initio method
2. Bermuda Principles
3. Bio informatics
4. Boolean Operator
5. Database
6. Gap Penalties
7. Internet
8. IP address
9. MSA
10. Orthologous Sequence
11. Phylogenic Tree
12. Scoring Matrix

Q.2. Differentiate the Following (Any three) **[06]**

1. PAM and BLOSUM matrix
2. BLAST and ClustalW
3. Local and Global sequence alignment
4. Primary and secondary databases

Q.3. Write short note on the following (Any Four) **[12]**

1. International Nucleotide Sequence Database Collaboration
2. Gene annotation
3. Drugs Designing through Bio-informatics
4. Phylogenic Analysis
5. DBMS organization types

Q.4. Write down the component of BLAST search and discus each in detail. Explain the criteria used for evaluating BLAST search result. **[06]**

OR

Write down the methods used for Pair wise sequence alignment and explain the dynamic programming method for local alignment in details with example.

Q.5. Write down the methods used for MSA and explain in details the procedure for Progressive Multiple Sequence Alignment with suitable example. **[06]**

OR

Define gene prediction. Explains the methods used for gene prediction in details.

****

NAVSARI AGRICULTURAL UNIVERSITY
N. M. COLLEGE OF AGRICULTURE
Eighth Semester B. Sc. (Hons.) Agri. End Examination (New) (Regular)
PART B

Course No: *PBG 8.11 (1+2)* **Title:** *Bio Informatics*

Date: 08-06-2015 **Time:** 10.45-12.30
Day: Monday **Total Marks:** *40.00*

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3. Bio informatics
4. Boolean Operator
5. Database
6. Gap Penalties
7. Internet
8. *IP address*
9. MSA
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11. Phylogenic Tree
12. Scoring Matrix

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2. BLAST and ClustalW
3. Local and Global sequence alignment
4. Primary and secondary databases

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2. Gene annotation
3. Drugs Designing through Bio-informatics
4. Phylogenic Analysis
5. DBMS organization types

Q.4. Write down the component of BLAST search and discus each in detail. Explain the criteria used for evaluating BLAST search result. **[06]**

OR

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Q.5. Write down the methods used for MSA and explain in details the procedure for *Progressive Multiple Sequence Alignment* with suitable example. **[06]**

OR

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****

Navsari Agricultural University
N. M. College of Agriculture
Department of Genetics and Plant Breeding
B. Sc. (Hons.) Agriculture
PBG 8.9 : Plant Tissue Culture

External Semester End Theory Examination

PART-A (Objective)

Date	: 03/06/2015	**Time**	: 10.00 to 12.30 hrs
Day	: Wednesday	**Marks**	: 80

Q.1 Choose most appropriate answer by encircling it 40

(1) Who is the father of plant tissue culture
(a) Haberlandt (b) Murashige (c) Skoog (d) White

(2) Lower auxin/cytokinine ratio induces development of
(a) Shoot (b) Callus (c) Root (d) Somatic embryo

(3) Frequency of diploids is higher in _____ culture
(a) Microspore (b) Anther (c) Both (a) and (b) (d) None of these

(4) _____ is utilized to study cytoplasmic inheritance
(a) Sexual hybrid (b) Vybrid (c) Cybrid (d) None of these

(5) Embryo abortion during wide hybridization can be prevented by
(a) Endosperm culture (b) Embryo culture (c) Anther culture (d) Meristem culture

(6) The metabolic processes are halted or complete stopped in case of
(a) Cryopreservation (b) Slow growth culture (c) Organogenesis (d) Gynogenesis

(7) _____ culture is utilized to study the process of apomixis
(a) Anther (b) Ovary (c) Meristem (d) None of these

(8) Triploids can be developed from
(a) Embryo culture (b) Endosperm culture (c) Anther culture (d) Pollen culture

(9) _____ receives cytoplasm as well as nucleus from both the parents
(a) Sexual hybrid (b) Cybrid (c) Somatic hybrid (d) None of these

(10) _____ is used to stabilize the pH and adsorb toxic brown substances.
(a) Coconut water (b) Casein hydrolysate (c) Phenol (d) Activated Charcoal

(11) Slow freezing involves the beneficial effect of
(a) Inter cellular ice formation (b) Intracellular ice formation (c) Dehydration (d) None of these

(12) The temperature of liquid nitrogen used for cryopreservation is
(a) -20°C (b) -100°C (c) 0°C (d) -196°C

(13) _____ is utilized for chromosome doubling
(a) Ethanol (b) Mercury chloride (c) Colchicine (d) None of these

(14) _____ stage of microspores is preferred for androgenesis in majority of plant species
(a) Uninucleate (b) Trinucleate (c) Binucleate (d) Tetranucleate

(15) Undifferentiated mass of the cell is known as _____
(a) Embryoids (b) Callus (c) Somatic embryo (d) None of these

(16) Development of haploid plants from microspore is known as
(a) Gynogenesis (b) Organogenesis (c) Androgenesis (d) Somatic embryogenesis

(17) Diploidization of haploid plant can be carried out through
(a) Colchicine (b) Endoreduplication (c) Endomitosis (d) All of these

(18) _____ is produced without fertilization
(a) Somatic embryo (b) Cybrids (c) Somatic hybrids (d) All of these

(19) _____ hormone breaks apical dominance
(a) Auxin (b) Cytokinin (c) ABA (d) GA_3

P.T.O.

(20) Haploid chromosome number is represented by
(a) n (b) 2n (c) x (d) 2x

(21) Which of the following technique is used to produce 100 homozygous line
(a) Embryo culture (b) Endosperm culture (c) Androgenesis (d) Micropropagation

(22) Somaclonal variation _____ has maximum chances of getting variation
(a) without *in vitro* selection (b) with *in vitro* selection (c) Both (a) and (b) (d) None of these

(23) _____ culture is utilized to study physiology and biochemistry of fruit development
(a) Endosperm culture (b) Embryo culture (c) Ovary culture (d) Protoplast culture

(24) Gametoclonal variation is observed due to
(a) Segregation (b) Recombination (c) Crossing over (d) All of these

(25) Which of the following is crucial for cryopreservation
(a) Freezing tolerance (b) Freezing susceptibility (c) Water content (d) All of these

(26) _____ culture is utilized to produce virus free plant
(a) Embryo (b) Meristem culture (c) Anther (d) Slow growth

(27) Segregation ratio in doubled haploid population obtained from heterozygous F_1 hybrid is
(a) 3 : 1 (b) 1 : 1 (c) 9 : 3 : 3 : 1 (d) 15 : 1

(28) "Stage 0" of micropropagation deals with
(a) Explant (b) Hardening (c) Mother plant (d) Rooting

(29) Which of the following hormone is utilized for induction of embryogenic potential
(a) Auxin (b) Ethylene (c) GA_3 (d) Cytokinin

(30) Presence of anther wall factors leads to more frequency of
(a) Haploids (b) Doubled haploid (c) Diploids (d) None of these

(31) Which of the following technique gives higher frequency of haploid plants
(a) Embryo culture (b) Endosperm culture (c) Androgenesis (d) Gynogenesis

(32) Production of differentiated organ from callus is known as
(a) Redifferentiation (b) Dedifferentiation (c) Differentiation (d) All of these

(33) Regeneration of shoot and root from callus is known as
(a) Direct Organogenesis (b) Indirect organogenesis (c) Somatic embryogenesis (d) Somaclonal variation

(34) Which of the following freezing method is preferred for cryo-preservation
(a) Slow freezing (b) Rapid freezing (c) Combined freezing (d) None of these

(35) Which of the following is utilized to delay metabolic activity in slow growth culture
(a) Temperature (b) Low oxygen pressure (c) Osmotic inhibitors (d) All of these

(36) Dormancy due to seed coat factors can be overcome by _____culture
(a) Immature embryo (b) Mature embryo (c) Endosperm (d) None of these

(37) Somaclonal variation is observed due to _____
(a) Karyotypic changes (b) Transposable elements (c) Mitotic recombination (d) All of these

(38) _____ is utilized as selective agent to isolate somaclonal variation for drought resistance
(a) PEG (b) NaCl (c) $HgCl_2$ (d) NaOH

(39) Which of the following agent stains dead protoplast during viability test
(a) FDA (b) CFW (c) Evan's blue (d) None of these

(40) Which of the following factors affect somaclonal variation
(a) Culture duration (b) Selective agent (c) Genotype (d) All of these

Navsari Agricultural University
N. M. College of Agriculture
Department of Genetics and Plant Breeding
B. Sc. (Hons.) Agriculture
PBG 8.9 : Plant Tissue Culture

External Semester End Theory Examination

PART-B (Subjective)

Date	: 03/06/2015	**Time**	: 10.00 to 12.30 hrs
Day	: Wednesday	**Marks**	: 80

Q-1 **Discuss cryopreservation along with its applications** **08**

OR

Discuss somatic embryogenesis in detail along with its applications and limitations.

Q-2 (A) Define / Explain the following **(Any Ten)** **05**

1. Slow growth culture
2. Artificial seed
3. Callus
4. Doubled haploid
5. Micropropagation
6. Organogenesis
7. Differentiation
8. Sterilization
9. Protoplast
10. Somatic hybrid
11. Somaclonal variation
12. Explant

Q-2 (B) Differentiate the following **(Any Four)** **04**

1. Somatic embryogenesis Vs Embryo culture
2. Androgenesis Vs Gynogenesis
3. Dedifferentiation Vs Redifferentiation
4. Sexual hybrid Vs Cybrid
5. Macronutrient Vs Micronutrient

Q-3 (A) Give applications of the following techniques **(Any Three)** **06**

1. Ovary culture
2. Protoplast fusion
3. Micropropagation
4. Embryo culture

Q-3 (B) Give brief answer for the following **(Any Six)** **06**

1. Stages of micropropagation
2. Role of auxin and cytokinin in organogenesis
3. Role of osmotic potential during protoplast isolation
4. Chromosome doubling
5. Advantage and disadvantage of gynogenesis
6. Causes of somaclonal variation
7. Mechanisms of protoplast fusion

(P.T.O.)

Q-4 (A) Give reasoning for the following **(Any Seven)** 7.0

1. Colchicine duplicates the chromosome number.
2. Aseptic condition is inevitable for plant tissue culture.
3. Water content of tissue is very important criteria for cryopreservation.
4. All the cells are not totipotent in the culture.
5. Microspore culture is preferred over anther culture.
6. Withdrawal of auxin is important in somatic embryogenesis.
7. Auxin cytokinin ratio is not important during mature embryo culture.
8. Gynogenesis is utilized to produce haploids from male sterile lines.

(B) Discuss organogenesis in detail along with its applications 4.0

OR

Discuss artificial seed in detail along with its applications

Navsari Agricultural University
N. M. College of Agriculture
Department of Genetics and Plant Breeding
B. Sc. (Hons.) Agriculture
PBG 8.9 : Plant Tissue Culture

External Semester End Theory Examination

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Day	: Wednesday	**Marks**	: 80

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Discuss artificial seed in detail along with its applications

Navsari Agricultural University
N. M. College of Agriculture
Department of Genetics and Plant Breeding
B. Sc. (Hons.) Agriculture
PBG 8.9 : Plant Tissue Culture

External Semester End Theory Examination

PART-B (Subjective)

Date	: 03/06/2015	**Time**	: 10.00 to 12.30 hrs
Day	: Wednesday	**Marks**	: 80

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Discuss artificial seed in detail along with its applications

Navsari Agricultural University
N. M. College of Agriculture
Department of Genetics and Plant Breeding
B. Sc. (Hons.) Agriculture
PBG 8.9 : Plant Tissue Culture

External Semester End Theory Examination

PART-B (Subjective)

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(B) Discuss organogenesis in detail along with its applications **4.0**

OR

Discuss artificial seed in detail along with its applications

Uni. Seat No :		Block Supervisor	
Regi. No :		Signature :	

N. M. COLLEGE OF AGRICULTURE, NAVSARI
EIGHTH SEMESTER (REGULAR), B.SC. (AGRI.)
SEMESTER END EXAMINATION-2015
PBG 8.8 – MOLECULAR BREEDING (1+2)

Date : 02.06.2015 **Time :** 10.00 to 12.30 hrs.
Day : Tuesday **Marks :** 40.00

PART-A

Q-1 Multiple Choice Questions **(Tick mark the appropriate answer)** **12.0**

1. **The term Nucleic acid was first time given by**
   a. Altman b. Jhonssen
   c. Bruce d. Stadler
2. **Which of the following is the most common form of DNA**
   a. A-DNA b. B-DNA
   c. C-DNA d. D-DNA
3. **The most common restriction enzyme used in gene cloning is**
   a. Type-I b. Type-II
   c. Type-III d. None of these
4. **Purines are the compound with**
   a. Single ring b. Double ring
   c. Triple ring d. All of above
5. **RAPD are**
   a. Dominant markers b. Recessive markers
   c. Co-dominant marker d. Both a & c
6. **Heterochromatin takes up deep stain during**
   a. Prophase b. Metaphase
   c. Anaphase d. Telophase
7. **During denaturation in PCR, temperature is about**
   a. 64^0C b. 74^0C
   c. 84^0C d. 94^0C
8. **Which of the following marker was first used to detect the DNA variation**
   a. AFLP b. RFLP
   c. RAPD d. Agarose
9. **Generally DNA markers are**
   a. Coding sequence of gene b. Non-coding sequence of gene
   c. Sequence closely linked to gene d. All of above
10. **Agarose Gel Electrophoresis separates the DNA/RNA up to difference of**
    a. 2 Kb b. 20 Kb
    c. 200 Kb d. 2000 Kb
11. **The author of reference book- Introduction to Plant Biotechnology is**
    a. B. D. Singh b. Phundan Singh
    c. H. S. Chawla d. P. K. Gupta
12. **Northen blotting techniques used for blotting**
    a. DNA samples b. Protein samples
    c. RNA samples d. All of above

Q-2 **Write the full form of the following abbreviations** **8.0**

1 **EDTA :**
2 **RAPD :**
3 **PFGE :**
4 **YAC :**
5 **TE :**
6 **Kb :**
7 **ADP :**
8 **cDNA :**
9 **SNPs :**
10 **RT-PCR :**
11 **MAS :**
12 **MAB :**
13 **SSR :**
14 **PAGE :**
15 **BAC :**
16 **RACE :**

Q-3 **Mention True or False** **10.0**

1. RAPD is a PCR based DNA marker.
2. Restriction enzymes are the molecular scissors.
3. In western blotting only proteins are blotted.
4. The qualitative traits having higher stability.
5. A combination of nucleoside and phosphate is called nucleotide.
6. 5' end always carry phosphorus group.
7. Lagging strand refers to discontinuously replicating strand of DNA.
8. Reliability of the RFLP markers are very high.
9. PCR is based on semi-conservative method of DNA replication.
10. The effect of individual gene is small and undetectable for quantitative traits.

Q-4 **Fill in the blanks** **10.0**

1. _____ samples are use in southern blotting.
2. Polymerase Chain Reaction was discovered by _____.
3. _____ DNA having a single copy per genome.
4. In tobacco mosaic virus _____ is the genetic material.
5. _____ sequence is referred as mirror image.
6. The universally accepted DNA replication method is _____ .
7. Two enzymes having same recognition site is referred as _____.
8. Linkage map give the indication of _____ and _____ of genes on chromosome.
9. Polymerase Chain Reaction also called as _____.
10. The process of DNA synthesis from RNA is called_____.

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N. M. COLLEGE OF AGRICULTURE, NAVSARI
EIGHTH SEMESTER (REGULAR), B.SC. (AGRI.)
SEMESTER END EXAMINATION-2015
PBG 8.8 – MOLECULAR BREEDING

Date : 02.06.2015 | **Time :** 10.00 to 12.30 hrs.
Day : Tuesday | **Marks :** 40.00

PART-B

Q-5 Define / Explain the following (Any Ten) **10.00**

1 Molecular Breeding
2 Co-dominant marker
3 QTL
4 Primer
5 Promiscuous DNA
6 Restriction enzymes
7 Transformation
8 Okazaki fragments
9 Palindromic sequance
10 Polymorphic marker
11 Allele
12 Isochizomers

Q-6 Differentiate the following (Any Five) **10.00**

1 Type-I and Type-II restriction enzyme
2 RAPD and RFLP
3 B-DNA and Z-DNA
4 Northern blotting and Southern blotting
5 Conventional breeding and Molecular breeding
6 PCR and Gene cloning

Q-7 Do as directed (Any Five) **20.00**

1 What is PCR? Classify different types of PCR. Enlist its applications, advantages as well as its limitations.
2 Describe the double helical model of DNA with well labeled diagram.
3 Write down the steps of RFLP and its applications.
4 Explain the applications of molecular breeding in agriculture.
5 Write a detail note on restriction endonuclease.
6 Write a detail note on Agarose gel electrophoresis.

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