Uni.	Seat No.	:
Reg.	No.:	

Centre: \_\_\_\_\_\_ Sign. of Supervisor: \_\_\_\_\_\_

Marks Obtained : \_\_\_\_

# AGRICULTURAL UNIVERSITIES OF GUJARAT

Anand Agricultural University, Anand
Junagadh Agricultural University, Junagadh
S.D. Agricultural University, S.K. Nagar

Fourth Semester End Examination of B.Sc. (Hons.) Horticulture (Regular) June- 2016 PART A: OBJECTIVE

Course No.: NRMH 4.6

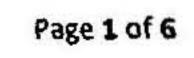
Title of Course: Soil and Plant Analysis (1+1)

Date : 21/06/2016	Time: 14:30 to 15:15 hrs.
Day : Tuesday	Marks: 40.00

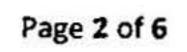
Tick mark ( $\sqrt{}$ ) most appropriate option from the following.

- 1. The most widely occurring clay mineral in the soil is \_\_\_\_\_.
  - a Kaoline
  - b Illite
- 2. \_\_\_\_\_ is a acid tolerant crop.
- c Montmorillonite
- d Smectite
- · Drinial

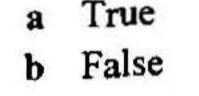
	a	Tea	c	Brinjal
	b	Sapota	d	Date palm
3.	Mo	ost resistant mineral to the weathering is		
	a	Olivine	с	Montmorillonite
	b	Feldspar	d	Quartz
4.	Mi	ca group of minerals are type of	of mi	inerals.
	a	Expanding	c	Allophane
	b	Non-expanding	d	Volcanic
5.	An	nong the following is a sulphate mineral.		
	a	Elemental S	c	Gypsum
	b	Copper suphide	d	Lime
6.	Th	e vertical axis is more develop than horizo	ntal	axis is not the charact ristics of
		ucture.		
	a	Platy	С	Blocky
	b	Prasmatic	d	b&c
7.	Gr	ades of structure indicate the0	f the	aggregates.
	a	Resistancy	С	Flexibility
	b	Stability	d	Buffering capacity
8.	Fa	irly durable and distinct aggregates are the	char	acteristics of structur
	8	Moderate	c	Structure less
	b	Weak	d	Strong
9.		is a store house of nutrients in the	soil	
	a	Mineral	c	Silt
	b	Sand	d	Organic matter

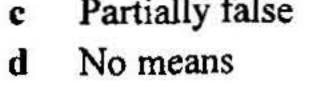


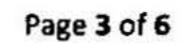
10			formation
10.	Among the following is responsible for aggre	egate	
	a Sand	c	Clay
11	b Silt	a	All
11.	Wet sieving method for aggregate size analy		
	a Shoemaker	c	Jackson
10	b Schoonover	d	Yoder n soil, than it become toxic to the plants.
12.	When CO <sub>2</sub> content becomes as high as	1.1	
	r 0.3%	c	15%
10	10%	d	25%
12	vgen diffusion rate at sh		
		c	Partially decreases
• •	b Le.	d	Not affected
14.			ndition exists.
	a Weak o idizing	c	Strong reducing
111 11-11	b Strong c idizing	d	Weak reducing
15.	The root growth ceases when oxygen diffusi	ion ra	
	<b>a</b> $0.32 \times 10^{-8}$	c	$20 \times 10^{-8}$
	<b>b</b> $10 \times 10^{-8}$	d	$28 \times 10^{-8}$
16.	Most of the gaseous interchange in soils is o	ccurs	s by
	a Aeration	c	Mass flow
	b Contact exchange	d	Diffusion
17.	With increase in water content of soil, mass	flow	of air is
	a Decrease	c	Partially increase
	<b>b</b> Increase	d	Not affected
18.	Formula for residual sodium carbonate is		
	a $(CO_3^2 + HCO_3) - (Na^+ + K^+)$	c	$(CO_3^{2} + HCO_3) - (Ca^{+2} + Na^{+})$
	<b>b</b> $(Ca^{+2} + Mg^{+2}) - (CO_3^{2-} + HCO_3^{-})$	d	$(CO_3^{2-} + HCO_3^{-}) - (Ca^{+2} + Mg^{+2})$
19.	Among the following microorganisms		is less in number per gram of dry soil.
	a Algae	c	Fungi
	b Bacteria	d	Actinomycetes
20.	Largest number of species present in soil is	genu	s of
	a Bacillus	с	Trichoderma
	b Pseudomonas	d	Actinomycetes
21.	Lignin is mostly decomposed by		
	a Bacteria	c	Fungi
	b Algae	d	All
22.	is not adsorbed by soil particles	s.	
	a NO3	c	Ca <sup>2+</sup>
	b Na <sup>+</sup>	d	Al <sup>3+</sup>
23.	Generally fungi are dominant in	soil.	
	a Alkaline	c	Acid
	b Sandy soil	d	All
24.	Nitrogen fixing capacity of algae is increase	d by	the application of
	a Nitrogen	с	Micronutrient
	b Potash	d	Phosphate



25.	Legumes fail to develop nodules in soil has $< 5.0$	ving n	Ч
	a < 5.0	c	> 6.5
1200	b 7.0	Б	All
26.	Mycorrhizae fungi shows ass	ociatio	n.
	a Associative	с	Non-symbiotic
	b Symbiotic	d	Free living
27.	Soil pH >8.5, ESP >15 and EC < 4 dS/m	is char	acteristics of
	a Saline soil	c	Saline-alkali soil
	b Alkali soil	d	Both a & b
28.	ion is not considered as a defloc	cculate	d ion.
	a Ca	c	N
	b Na	d	All
29.	Salt content is injurious to plant	t growt	h.
	a < 0.1%	C	< 10%
	b > 0.1%	d	> 10%
30.	It is generally found that higher the ESP,		_ is the soil pH.
	a Higher	c	Lower
	b Neutral	d	No change
31.	Among the following is a example of orga	nic arr	endment.
	a Gypsum	c	Urea
	b Lime	d	Pressmud
32.	To replace 20 me Exch. Na/100g,	t/ha	gypsum is required.
	a 22.4	c	1.12
	b 1.92	d	38.4
33.	Unit for electrical conductivity is	<u> </u>	
	a dS/m	c	ppm
	b meq/l	d	per cent
34.	Among the following is not relates with co	ohesion	1 phenomena.
	a Soil to soil	C	Fertilizer to fertilizer
	<b>b</b> Water to water	d	Water to soil
35.		n rate t	han clayey soil.
	a Higher	C	Medium
	b Low	d	Equal
36.	Diameter of clay particle is		
	a < 0.02  mm	c	< 0.02 cm
	b < 0.002  mm	d	< 0.002 cm
37.	is a salt tolerant crop.		~
	a Date palm	c	Pea
1000	b Lemon	d	Tea
38.	Acid sulphate soil is also known as	*	Galanahala
	a White alkali soil	c	Solonchak
-	<b>b</b> Black alkali soil	d	Cat clays
39.	Not all the water hold by soil is available t	-	
	a True	c	Partially false

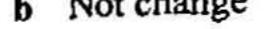




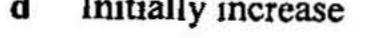


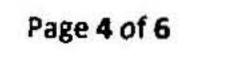
40. Soil contains CEC 25 me/100g and base saturation 76%. Than what will be the value of base unsaturation.

	base ansataration.		
	a 42%	С	24%
	b 34%	đ	12%
41.	In the case with gravitational water,	por	es play major role.
	a Micro	c	Macro
	<b>b</b> Microorganisms	d	All
42.	Among the following, moves	in the	vapor form.
	a Gravitational water	c	Hygroscopic water
	<b>b</b> Capillary water	d	Water at Wilting coefficient stage
43.	Available capillary water is held with		atmospheric pressure in the soil.
	a < 1/3	c	15
	<b>b</b> 1/3 to 31	d	1/3 to 15
44.	The effective range for the measurement of	soil r	noisture through tensiometer is
	atmosphere.		
	a 0 to 0.33	c	1 to 15
	<b>b</b> 0 to 0.85	d	1 to 31
45.	In neutron scattering method for soil moist	ure es	timation radioactive material is
	used.		
	a Baryllium	c	Gypsum
	b Uranium	d	Cesium
46.	H <sup>+</sup> ion activity in the soil solution is genera	ally m	easured as
	a Exchange acidity	c	Residual acidity
	b Active acidity	d	Electrical conductivity
47.	Acid soils show the deficiency of		
	a Ca	c	N
	b P	d	All
48.	The rate of lime requirement is determined	in the	aboratory by method.
	a Subbiah and Asija	c	Shoemaker
	b Olsen	d	Schoonover
49.	To replace 1 me H/100g soil, it requires		milligram lime/ 100g of soil.
	a 86	c	1.2
	b 50	d	1.9
50.	Gypsum is recommended for reclamation of	of	soil.
	a Saline	c	Acid
	b Alkali	d	Sandy
51.	Among the following is the alternate option	n of li	me for acid soil.
2 <del>-</del> 04 <del>31</del> -23	a Gypsum	c	Calcium oxide
	<b>b</b> Sulphuric acid	d	None
52.	Among the following is the alternate option	nofg	ypsum for sodic soil.
9 <u>7</u> 0	a Sulphuric acid	c	Calcium oxide
	b Hydroxide of lime	d	None
53.	The overall effect of submergence is to		the pH of alkaline soil.
and a second	a Increase	c	Decrease
	b Not change	d	Initially increase



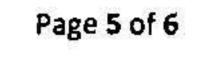
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54.	Wetland soil which is not wet above a dep	th of 25	5 cm is comes under
	a Class 1	с	Class 3
	b Class 2	d	Class 4
55.	Among the following is used	for the	analysis of soil organic carbon.
	a 0.32% KMnO <sub>4</sub>	С	IN K <sub>2</sub> CR <sub>2</sub> O <sub>7</sub>
	b 0.5 M NaHCO <sub>3</sub>	d	1N CH <sub>3</sub> COONH <sub>4</sub>
56.	Flame photometer is ty	pe of in	nstrument.
	a Emission	С	Radiation
	<b>b</b> Absorption	d	Turbidimetric
57.	Flame photometer is used for the analysis	of	
	a P .	c	K
	b Zn	d	All
58.	For electrical conductivity (EC) analysis	<del></del>	soil:water ratio is used.
	a 1:1	c	1:2.5
	<b>b</b> 1:10	g	1:5
59.	Unit for residual sodium carbonate is		
	a mg/kg	C	Kg/ha
	b me/l	d	Unit less
60.	is submergence tolerant crop.		
	a Rice	c	Tomato
	b Maize	d	Lemon
61.	Water having RSC value, car	nnot su	itable for irrigation purpose.
	a 10-18 me/l	c	> 2.50 me/l
	b >15%	d	4 dS/m
62.	For the analysis of Ca from irrigation wate	er	indicator is used.
	a Ferroin	c	Murexide
	b EBT	d	Mixed
63.	Lambert's and Beer's law is associated wi	ith	
	a EC meter	с	Flamephotometer
	b Spectrophotometer	d	Atomic absorption spectrophotometer
64.	Soil sample should be dried in a hot air ov	en at	°C for moisture determination.
	a 45	С	60
	<b>b</b> 90	d	105
65.	Which is a secondary mineral?		
	a Plagioclase feldspar	c	Orthoclase feldspar
	b Hornblende	d	Gypsum
66.	In the volumetric composition of mineral	soil, mi	neral matter accounts
	a 45%	с	5%
	b 25%	d	100%
67.	Which type of soil structure is best for agr	iculture	e point of view?
	a Blocky	c	Crumby
	b Platy	d	None of these
68.	Which one is the most important factor for	r hyster	resis in the soil?
	a Entrapment of air	C	Entrapment of water
	b Bulk density	d	Microorganisms

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69.	The arrangement of soil particles is called as		
	a Soil structure	c	Soil texture
	b Soil profile	d	Soil horizon
70.	A wet soil sample of 100 g gave 80 g of dry s	soil	on oven drying. The moisture percentage is
	·		
	a 20	c	30
	b 25	d	33
71.	Which is/are the micro-fauna?		
	a Protozoa	c	Bacteria
	b Fungi	d	All
72.	is considered to be most	imp	ortant of the soil organisms responsible for
	the conversion of $NH_4^+$ to $NO_2$ .		
	a Nitrobacter	c	Nitrosomonas
	b Azotobacter	d	Azospirillum
73.	Osmotic pressure (OP) = x EC (dS/	'n).	
	a 0.0036	c	0.036
	<b>b</b> 0.36	d	3.6
74.	In acid soil toxicity is developed due to		ion.
	a Al <sup>3+</sup>	c	Na <sup>+</sup>
	b PO4 <sup>3-</sup>	d	Ca <sup>2+</sup>
75.	In soil air, concentration of CO2 is	%.	
	a 0.03	c	3.0
	b 20	d	0.3
76.	ionic form of nitrogen is domin	ant 1	
	a NH <sub>3</sub>	с	NH4 <sup>+</sup>
	b NO3	d	NO <sub>2</sub>
77.	Sandy soil usually contains % silt and	2 (200)	
	a > 12	c	> 70
	<b>b</b> < 12	d	< 70
78.	Kg/ha =		
	a ppm x 224	c	ppm x 2.24
	<b>b</b> ppm x 0.224	d	ppm x 22.4
79.	Molecular weight of CaCO <sub>3</sub> is	1.001	<b>FF</b>
1.5.6	a 50	c	100
	b 86	d	192
80.	As the water content of a soil increases, soil	10.000	
	a Increases	c	Decreases
	b Remains unchanged	d	None of these
	b itemanis anonangoa		

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#### AGRICULTURAL UNIVERSITIES OF GUJARAT

1. Anand Agricultural University, Anand

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3. Navsari Agricultural University, Navsari

4. S.D. Agricultural University, S.K. Nagar

## Fourth Semester End Examination of B.Sc. (Hons.) Horticulture (Regular) June- 2016

#### PART B: SUBJECTIVE

Course No.: NRMH 4.6

Title of Course: Soil and Plant Analysis (1+1)

2		1/06/2016				Time	: 15:15 1	to 17:00 hrs.
Day	: T	uesday					M	larks: 40.00
	Mo	lecular weight: Ca=40,	Mg=24,	K=39,	Na=23	S=32,	H=1,	C=12
Q.1	A	Define or explain (any	five).					5.0
		1. Primary mineral	3. Salir	ne soil	5.	Sandy so	il	
		2. Soil aggregate	4. Soil	pН	6.	Field cap	oacity of	soil
	B	Explain in detail (any	one).					5.0
		1. Reclamation and man	nagement o	f acid soil.				
		2. Management of alkal	i soil for cr	op product	tion.			

## Q.2 A Give scientific reasons of the following (any five).

- 1. Gypsum is not considered as a liming material.
- Clay and organic matter plays an important role in the forming of soil aggregates.
- 3. Soil air contains more  $CO_2$  than atmospheric air.
- 4. Salt affected soils developed in arid and semi-arid regions.
- 5. Soil samples are taking in a zig-zag manner in the field.
- 6. Gravitational water is not useful to the plants.

## B Calculate any one of the following.

2

A soil having CEC 20 me/100g soil and various cations are present in following proportion: Ca: 10 me/100g, K: 1 me/100g, Mg: 5 me/100g and Na: 3 me/100g. By using these data calculate the value of, i) % base saturation, ii) % base unsaturation, iii) Ca, Mg, Na and K in kg/ha, iv) Workout lime requirement to neutralize the soil acidity.

### OR

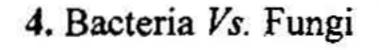
Soil contains 10 me exch. Na/100g soil and CEC 40 me/100g. It is desire to reduce the ESP to 10 %. Calculate the gypsum requirement to amending the plough layer.

- Q.3 A Differentiate the following (any two).
  - 1. Gypsum requirement Vs. Lime requirement
  - 2. Symbiotic N fixation Vs. Non symbiotic N fixation
  - 3. Montmorillonite clay mineral Vs. Kaolinite clay mineral

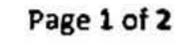
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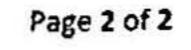


	B	Explain following with figure (any two).
		1. Chemistry of waterlogged soil
		2. Hysteresis
		3. Flame photometer
Q.4	A	Do as directed of the following (any five).
		1. Enlist cultural method for reclamation and management of saline soil.
		2. Give the objectives of soil analysis.
		3. Give the volumetric composition of soil.
		4. Enlist the different methods for soil moisture measurement.
		5. Write the characteristics of degraded alkali soils.
		6. Classify different types of soil structure.
	B	Write short notes (any two).
		1. Physical classification of water.
		2. Management of sandy soil for crop production.

3. Kinds of soil acidity.

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