

Course no. - SSAC-242

Course title- Problematic soil and their management

1. Which fertilizer produces acidity in soil?

- (A) Ammonium sulphate (B) Sodium nitrate
(C) Calcium ammonium nitrate (D) Calcium nitrate

Ans. **a**

2. Which among the following salt is also called black alkali?

- a) Na_2CO_3 b) Na_2SO_4
c) NaCl d) NaOH

Ans. **a**

3. Solonchak soil is the other name for _____

- a) Alkali Soils b) Sodid Soils
c) Saline-alkali soils d) Saline soils

ans: **d**

4. Dolomitic limestone is favored over other liming materials when which essential nutrient element is in low supply?

- a) Calcium b) Potassium
c) Magnesium d) Sodium

ans. **c**

5. Aluminum is considered to be an acid cation because _____

- a) It can exchange with Ca^{2+} ions b) It hydrolyzes in water, releasing H^+ ions
c) It is toxic to plant roots c) all of the above

ans. **b**

6. Irrigation water can be moderately safe having RSC....

- a. $<1.25 \text{ meq L}^{-1}$ b. $> 2.5 \text{ meq L}^{-1}$
c. $1.25\text{-}2.5 \text{ meq L}^{-1}$ d. both a & c

Ans. **c**

7. Which type of soil acidity is measured by soil pH?

- a) Passive acidity
- b) Active acidity
- c) Total acidity
- d) Exchangeable acidity

Ans: **b**

8. Who proposed the term lime requirement?

- a) Schoonover
- b) Schofield
- c) Ramamoorthy
- d) Shoemaker *et al.*

Ans: **d**

9. For amelioration of which among the following soils is Gypsum used?

- a) Alkali soil
- b) Saline soil
- c) Acid soil
- d) Solanchalk soil

Ans: **a**

10. In terms of which among the following is salinity is measured?

- a) SAR
- b) pH
- c) ESP
- d) EC

Ans: **d**

11. The EC of saturated extract of the soil is $>4 \text{ dS m}^{-1}$, ESP < 15 and pH < 8.5 then this soil is__

- a) saline-sodic soil
- b) alkali soil
- c) saline soil
- d) sodic soil

ans. **c**

12. The process of breakdown of H-clay under alkaline condition is known as__

- a) solonisation
- b) salinization
- c) alkalization
- d) solodisation

ans. **d**

13. White crust on the soil surface is morphological character of ____ soil.

- a) saline non-sodic soil
- b) non saline alkaline soil
- c) sodic soil
- d) saline alkali soil

ans. **a**

14. SAR having range 10-18 have which class?

- a. High sodium hazard
- b. low sodium hazard
- c. medium sodium hazard
- d. very high sodium hazard

Ans. c

15. Which crop is not highly salt tolerant crop?

- a) Barley
- b) Soybean
- c) Cotton
- d) Rye

ans. b

16. What is sodium adsorption ratio range for high sodicity hazard?

- a. 10-18
- b. 0-10
- c. 18-26
- d. >26

Ans. c

17. Acidity develops due to hydrogen (H^+) and Aluminium (Al^{3+}) ion on the soil colloids known as__

- a) Reserve acidity
- b) Active acidity
- c) Residual acidity
- d) Total acidity

ans. a

18. White alkali soil mostly formed in_____

- a) Tropical region
- b) Humid and semi humid region
- c) Arid and semi arid region
- d) Subtropical region

ans. c

19. A soil having dominance of hydrogen (H^+) and aluminium (Al^{3+}) relative to hydroxyl (OH^-) ions is called as__

- a) Acid soil
- b) Saline alkali soil
- c) Acid sulphate soil
- d) Saline soil

ans. a

20. Bacteria function better in soils having ____

- a) Low pH
- b) High pH
- c) Moderate pH
- d) Moderate to high pH

Ans. d

21. What is the formula for Residual sodium carbonate?

- a. $RSC = (CO_3^{2-} - HCO_3^{-}) + (Ca^{2+} + Mg^{2+})$
- b. $RSC = (CO_3^{2-} - HCO_3^{-}) + (Ca^{2+} - Mg^{2+})$
- c. $RSC = (CO_3^{2-} + HCO_3^{-}) - (Ca^{2+} - Mg^{2+})$
- d. $RSC = (CO_3^{2-} + HCO_3^{-}) - (Ca^{2+} + Mg^{2+})$

Ans. **d**

22. Acid sulphate soil having pH____

- a) >4.5
- b) <4.5
- c) <4.0
- d) > 4.0

ans. **c**

23. Acid sulphate soil which contain oxidized iron sulphides____

- a) Normal acid sulphate soil
- b) Actual acid sulphate soil
- c) Potential acid sulphate soil
- d) Oxidized acid sulphate soil

ans. **b**

24. Hydrogen sulphide causes akiuchi disease in which crop?

- a) wheat
- b) Oat
- c) Barley
- d) Rice

ans. **d**

25. Land capability classes have:

- a. 3 categories
- b. 4 categories
- c. 5 categories
- d. 8 categories

Ans. **d**

26. Acidic soils can be characterized by _____

- a) Low pH
- b) High pH
- c) Texture
- d) Colour

Answer: **a**

27. Which of the following ions is not found excess in acidic soils?

- a) Al
- b) Fe
- c) Mg
- d) Cu

Answer: **c**

28. Which of the following is majorly found in acid sulphate soils?

- a) Pyrite
- b) Copper
- c) Aluminium
- d) Magnesium

Ans: **a**

29. A soil, which has pH is 8.5 to 10, ESP more than 15 and EC less than 4 dS m⁻¹ is called....

- a. Saline soil
- b. Alkali soil
- c. Saline alkali soil
- d. All of the above

Ans. **b**

30. Which of the following substance can be used for soil reclamation?

- a) Gypsum
- b) Citric acid
- c) Phosphoric acid
- d) Oxalic acid

Answer: **a**

31. Alkali soils are reclaimed by _____

- a) leaching of soil
- b) using limestone as a soil amendment
- c) using gypsum
- d) provision of drainage

Answer: **c**

32. If the electrical conductivity of the irrigation water ranges from 0.25 – 0.75 dS m⁻¹, then what is their suitability?

- a) No restriction on its use
- b) Can be used with moderate leaching
- c) unsuitable for irrigation
- d) Can't used due to restricted drainage

Answer: **b**

33. Salinity class of irrigation water which having EC 0.75-2.25 dS m⁻¹....

- a. Low salinity
- b. High salinity
- c. Very high salinity
- d. Medium salinity

Ans. **b**

34. What is Solonetz soil?

- a) White alkali soil
- b) Black alkali soil
- c) Highly saline soil
- d) Non-saline soil

Answer: **b**

35. A large amount of soil can move with the run off called _____

- a) Soil erosion
- b) Soil conservation
- c) Soil pollution
- d) Soil moving

Answer: **a**

36. Sensitive crop having.....ppm boron concentration for safe use of irrigation water.

- a. <0.33 ppm
- b. <0.35 ppm
- c. <0.23 ppm
- d. < 0.38 ppm

Ans. a

37. Phosphorus uptake in alkali soil in the form of _____

- a) $\text{H}_2\text{PO}_4^{4-}$
- b) HPO_4^{2-}
- c) PO_4^{3-}
- d) H_3PO_4

Ans. c

38. Kari is the local name of _____

- a) Acid soil
- b) Saline soil
- c) Acid sulfate soil
- d) Alkali soil

Ans. c

39. A soil which has pH less than 8.5, ESP less than 15 and EC more than 4 mmhos/cm is called-

- a. Saline soil
- b. Alkaline soil
- c. Saline-alkali soil
- d. None of these

Ans. a

40. In alkali soils, phosphorous is fixed as:

- a. Iron and Aluminum phosphate
- b. Calcium phosphate
- c. Fluoroapatite
- d. Hydroxyapatite

Ans. b

41. Salinity class of irrigation water which is not suitable for irrigation....

- a. C_1
- b. C_3
- c. C_4
- d. C_2

Ans. c

42. Absorbed hydrogen and aluminium are largely responsible for:

- a. Soil acidity
- b. Soil alkalinity
- c. Neutrality
- d. None of the above

Ans. a

43. According to land capability classification, the soils, which are not suitable for crop cultivation, belong to:

- a. Class I
- b. Class III
- c. Class IV
- d. Class VIII

Ans. d

44. Acid soils can be reclaimed by:

- a. CaCO_3
- b. H_2SO_4
- c. $\text{Ca SO}_4 \cdot 2\text{H}_2\text{O}$
- d. HNO_3

Ans. a

45. What is mean by C_2S_3 class?

- a. Medium salinity & High sodium hazard
- b. High salinity & low sodium hazard
- c. Very high salinity & medium sodium hazard
- d. Low salinity & very high sodium hazard

Ans. a

46. Zinc deficiency occurs in:

- a. light soil
- b. Calcareous soils
- c. Soils low in phosphorous
- d. Soil having pH 7.5

Ans. b

47. Ammonia lost through volatilization in significant quantities from:

- a. Alkaline soils
- b. Acidic soils
- c. Saline soils
- d. None of these

Ans. b

48. Barley, date palm and cotton are _____ salt tolerant:

- a. High
- b. Low
- c. Medium
- d. None of these

Ans. a

49. Sodicity hazard evaluated by...

- a. Exchangeable sodium percentage
- b. Sodium adsorption ratio
- c. Soluble sodium percentage
- d. Residual sodium carbonate

Ans. b

50. Continuous heavy rainfall leads to the formation of:

- a. Saline soil
- b. Sodic soil
- c. Acid soil
- d. Saline-sodic soil

Ans. c

51. land capability unit described on the basis of...

- a. Properties of land
- B. Management practices to be used
- c. Hazard/Limitations of land
- d. Colour of land

ans. b

52. Degree of soil salinity is indicated by its:

- a. Total soluble salt content
- b. Organic matter content
- c. Nitrogen content
- d. exchangeable Na content

Ans. a

53. Which heavy metal content in water is responsible for Minamata disease?

- a. cadmium
- b. fluoride
- c. chromium
- d. mercury

ans. d

54. NO_3 is present in excess amount in drinking water causes...

- a. Minamata disease
- b. Anaemia
- c. Methamoglobinemia disease
- d. temporary blindness

Ans. c

55. Cream, soap, paint & wax are the sources of which water pollutant?

- a. Aldrin
- b. Polychlorinated biphenyls
- c. Vinyl chloride
- d. DDT

Ans. b

56. For managing acid soils following chemical amendment is quite essential:

- a. ZnSO_4
- b. CuO
- c. CaO
- d. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

Ans. c

57. Lime requirement determined by which method?

- a. SMP buffer method
- b. Compleximetric method
- b. volumetric method
- d. Gravimetric method

Ans. a

58. In acid soils, phosphorous is fixed as:

- | | |
|--------------------------------|----------------------|
| a. Iron and Aluminum phosphate | b. Calcium phosphate |
| c. Fluroapatite | d. Hydoxyapatite |

Ans. a

59. Land capability subclasses described on the basis of...

- | | |
|-------------------------------|------------------------------------|
| a. Properties of land | B. Management practices to be used |
| c. Hazard/Limitations of land | d. Colour of land |

ans. c

60. Salinity class of irrigation water which is suitable after leaching....

- | | |
|--|-------------------------------------|
| a. C ₁ - Low salinity | b. C ₃ - High salinity |
| c. C ₄ - Very high salinity | d. C ₂ - Medium salinity |

Ans. d

61. Irrigation water can be unsafe having RSC....

- | | |
|---------------------------------|------------------------------|
| a. <1.25 meq L ⁻¹ | b. > 2.5 meq L ⁻¹ |
| c. 1.25-2.5 meq L ⁻¹ | d. both a & c |

Ans. b

62. Soil having 5-15 CaCO₃ % known as...

- | | |
|---------------------------|-----------------------------|
| a. Highly calcareous soil | b. Slightly calcareous soil |
| c. Non calcareous soil | d. Moderate calcareous soil |

Ans. d

63. Acid rain results when.....gases are emitted.

- | | |
|-------------------------------------|-------------------------------------|
| a. Carbon dioxide | b. Nitrogen dioxide & sulphur oxide |
| c. Sulphur dioxide & nitrogen oxide | d. All of above |

Ans. c

64. Base unsaturated soil means...

- | | |
|----------------|------------------|
| a. Alkali soil | b. Acid soil |
| c. Saline soil | d. Degraded soil |

Ans. b

❖ **Answer in one sentences**

1. Source of DDT water pollutant-
2. Example of heavy metals responsible for water pollution-
3. Enlist materials which are used to reclaim acid soil-
4. Examples of highly salt tolerant crops-
5. Examples of sensitive salt tolerant crop-
6. Amendment used to reclaim alkali soil-
7. Method used to determine lime requirement-
8. Define lime requirement.
9. Define gypsum requirement.
10. Acid rain contain acids.
11. Enlist the sources of soil pollution.
12. Enlist the sources of soil pollution.
13. Any 4 characteristics of saline soil.
14. Any 4 characteristics of sodic soil.
15. Any 4 characteristics of acid soil.
16. Which factors are responsible for formation of saline soil?
17. Classification of calcareous soil.
18. Explain type of soil acidity.
19. Factor responsible for formation of acid soil.
20. Explain types of acid sulphate soils.
21. Enlist causes of soil erosion. And explain any 4
22. Enlist and explain types of water erosion.
23. Enlist management practices to reduce eroded soil.
24. Explain causes of land degradation.
25. Which land classes is considered as suitable for cultivation?
26. Enlist common multipurpose trees.
27. Define bioremediation & phytoremediation.
28. Give the examples of phytoremediators.

29. Give the examples of boron sensitive and boron tolerant crops.
30. Write any 4 advantages of phytoremediation.
31. Enlist the criteria's which describe the quality of irrigation water.
32. Enlist measures for conversion of saline water to good quality water.
34. Give the classification of problematic soils/ salt affected soils.
35. Write down effect of saline soil on plant growth.
36. Enlist the sources of water pollutions. Explain any 4.
37. Enlist the sources of soil pollutions. Explain any 4.
38. Enlist measures to prevent soil pollution.
39. Define Submerged soil.
40. Enlist changes occurring in submerged soil.
41. Measures to manage submerged/ waterlogged soil.
42. What are the effects of flooded soil on plant growth?

SSAC-242 Problematic Soils and their Management

I. Choose the Correct answer:

1 is the capacity of a specific kind of soil to function within ecosystem and land – use boundaries, to sustain biological productivity, maintain environmental quality and sustain plant, animal and human health.

- A Soil Health B Soil Quality C Buffering capacity D Biodiversity

Ans: B. Soil Quality

2 defined as being a state of dynamic equilibrium between flora and fauna and their surrounding soil environment in which all the metabolic activities takes place

- A Biodiversity B Soil Buffering capacity C Soil Quality **D Soil Health**

3. Which one of the following is not a soil physical quality indicator.

- A Texture B Effective depth of soil and rooting **C Microbial biomass and N** D Water Holding Capacity

4. is defined as the detachment of soil particles their transportation from one place to another and deposition elsewhere through water, wind, natural waves, snow, gravity and other forces.

- A Soil erosion** B Transportation C Transformation D Soil degradation

5. In Splash erosion falling rain drop is capable of generating a force equals to almost times of its weight.

- A 12 times **B 14 times** C 10 times D 15 times

6. The erosion in which soil matrix is lost but remains undetected for a long period and a thin veneer of soil is removed from large areas uniformly by during every rain even producing area off is called ----- erosion.

- A Splash erosion B Gully erosion **C Sheet erosion** D Rill erosion

7. Universal soil Loss Equation was given by

- A Wischmeier and smith **B Singh et. al** C Browning et. al D Kinsel, 1980

8. The movement of soil by wind in a series of short bounces along the surface of land carrying fine particles of 0.15 to 0.5 mm diameter is called

- A suspension B Surface creep C Aeolian **D Saltation**

9. In strongly acidic soils, the concentrations of exchangeable aluminium and hydrogen ions contribute to

- A activity acidity **B Exchangeable acidity** C Reserve acidity D potential acidity

10. and are mainly responsible for soil acidity

- A Hydrogen and silicon B Aluminium and silicon **C Hydrogen and Aluminium** D Iron and aluminium

11. Acid soils in India have been formed due to drastic weathering associated with and

- A Hot humid and heavy rainfall** B cold humid and heavy rainfall C Hot humid and low rainfall D cold humid and low rainfall

12. The extend of acid soils in Tamil Nadu is

- A 6.79 m ha B 11.72 m ha C 0.60 m ha **D 4.80 m ha**
13. Acid soils are
 A Base saturated **B Base unsaturated** C acid saturated **D Acid unsaturated**
14. Acid soils can be reclaimed by
 A Gypsum B Sodium **C Calcium Carbonate** D Bicarbonate
15. The lime requirement for acid soil was given by
A schoemaker B Scoon over C Mehlich D Cate and Nelson
16. What is the relationship between EC and TDS.
 A TDS = EC/640 B TDS = EC + 640 **C TDS = EC x 640** D TDS = 640 - EC
17. What is the formula to know about the sum of soluble cation or anion
 A EC/10 B EC+10 **C ECx10** D EC-10
18. The soils with PH <8.5, ESP <15 and ESP >4 d s/m is categorised as
 A Sodic soil **B Saline soil** C Saline-alkali soil D acid soil
19. Alkali soils are characterised by
 A $P^H < 8.5$ ESP < 15 EC < 4 $ds\ m^{-1}$ B $P^H < 8.5$ ESP > 15 EC > 4 $ds\ m^{-1}$ C $P^H > 8.5$ ESP < 15 EC > 4 $ds\ m^{-1}$ **D $P^H > 8.5$ ESP > 15 EC < 4 $ds\ m^{-1}$**
20. soils are formed as a result both salinization and alkalisation processes.
 A Saline soils B alkali soils C saline-alkali soils **D sodic soils**

Match the following:

- A 21. Splash erosion - a. Rills with 30 cm depth
 A 22. Sheet erosion - b. Intermediary between sheet and fully
 A 23. Rill erosion - c. 2 metres
 A 24. Gully erosion - d. uniform run off
- | | | | |
|-------------------|-----------------|-----------------|-------------------|
| i. A 21-a | A 22 - b | A 23 - c | A - 24 - d |
| ii A 21-d | A 22 - c | A 23 - b | A - 24 - a |
| iii A 21-c | A 22 - d | A 23 - b | A - 24 - a |
| iv A 21-b | A 22 - bc | A 23 - d | A - 24 - a |
- A 25. K - a. Rainfall factor
 A 26. R - b. Soil erodability factor
 A 27 L - c. Slope - gradient factor
 A 28 S - d. slope length factor
- | | | | |
|-------------------|---------------|----------------|-----------------|
| i. A 25-a | A 26 b | A 27- d | A 28 - c |
| ii. A 25-b | A 26 a | A 27- d | A 28 - c |
-
- | | | | |
|------------|--------|---------|----------|
| iii A 25-d | A 26 c | A 27- a | A 28 - b |
| iv A 25-a | A 26 b | A 27- c | A 28 - d |
- A 29. Central Soil Salinity Research Institute - A. Bhopal
 A 30. National Bureau of Soil Survey & Land Use - B. New Delhi
 A 31. Indian Society of Soil Science - C. Nagpur

A 32. Indian Institute of Soil Science	-	D. Karnal	
i. A 29-b	A30 c	A 31- a	A 32 - d
ii. A 29-c	A30 b	A 31- d	A 32 - a
iii A 29-a	A30 b	A 31- c	A 32 - d
.			
iv A 29-d	A30 c	A 31- b	A 32 - a
.			
A33. Surface crusting	- Gypsum application		
A34. Sub surface hard pan	- poor germination		
A35. Fluffy paddy soils	- Chiesel plough		
A36. Alkali soils	- Cauvery delta		
i. A 33 b	A34 c	A 35- d	A 36 - a
ii. A 33-c	A34 b	A 35- d	A 36 - a
iii A 33 -a	A34 b	A 35- c	A 36 - d
.			
iv A 33-d	A34 c	A 31- b	A 32 - a
.			

State Correct / Incorrect statement

A37. Identify the **correct** statement from the following

- The CaCO_3 equivalent of burnt lime (CaO) is 1.786**
- The CaCO_3 equivalent of burnt lime (CaO) is 0.56
- Liming increases the soil acidity
- A soil having smectitic clay with higher exchange capacity would require less lime than a soil having Kaolinite for an equal rise in pH.

A38. Identify the **incorrect** statement

- Rice has good tolerance to acidity since flooding to rice field raises the pH to almost neutrality
- Minor millet and finger millet are quite tolerant to acidity shows poor response to liming
- Bengal gram, lentil groundnut, maize, sorghum, show medium response to liming
- Pigeon pea, Sobean, and cotton are resistant to soil acidity**

A39. Identify the **correct** statement

- Slow permeable soil is mainly due to low clay content
- The infiltration rate of slow permeable soil is < 10 cm per day
- The capillary porosity is high in slow permeable soil**
- Slow permeable soil has good drainage, good aeration and oxidised condition.

A40. Identify the **incorrect** statement

- The reason for the formation of sub surface hard pan in red soils is due to the illuviation of the clay to the sub surface horizons
- The hard pan is characterized with high bulk density
- Sub soil hardpan is commonly found in black soils**
- Chiselling technology is used to overcome sub surface hardpan.

Part _ B

The salt affected soils occur in the arid and semiarid regions where evapotranspiration greatly exceeds precipitation

B1. Which of the following statement is incorrect pertaining to the salt affected soils

- Saline soils are having $\text{EC} > 4 \text{ dSm}^{-1}$
- Saline soils were formerly called as white alkali soils
- Green manuring reduces soil salinity
- Sodic soils are having $\text{EC} > 4 \text{ dSm}^{-1}$**

B2. Which of the following statement suits with sodicity

- a. **Excess exchangeable sodium in alkali soils affects both the physical and chemical properties of soils**
- b. Sand filling decreases the capillary movements of water
- c. Distillery spent wash is basic in nature
- d. Pulses are highly tolerant to sodicity

B3. Addition of green manuring to the salt affected soil

- a. **Counteracts the effect of salinity**
- b. Increases the soil salinity
- c. Reduces the pH
- d. Both b and c

B4. Alkali / Sodic soils are having conductivity of saturation extract

- a. **Less than 4 dSm⁻¹**
- b. Greater than 4 dSm⁻¹
- c. Less than 15
- d. Greater than 15

When excess soluble salts accumulate in the soil with high exchangeable cations sodium frequently become the dominant cation in the soil solution resulting in alkali or sodic soils

B5. Major production constraints with reference to sodic soils

- a. Dispersion of soil colloids
- b. Specific ion affect
- c. Reduces buld density
- d. **Both a and b**

B6. The recommended dose of distillery spent wash to reclaim sodic soil is

- a. **2 lakh litre per acre**
- b. 2 lakh litre per hectare
- c. 5 lakh litre per acre
- d. 5 lakh litre per hectare

B7. Which of the following crop is most preferred for Sodic soil

- a. Black gram
- b. Groundnut
- c. **Rice**
- d. Pearl millet

B8. Highly tolerant fruit trees for sodicity is

- a. Banana
- b. **Ber**
- c. Jack
- d. Mango

Soil acidity refers to the presence of higher concentration of H⁺ in soil solution and at exchange sites

B9. The pH range of 3-4 is categorized as

- a. Slightly acidic
- b. Moderately acidic
- c. **Very strong acidic**
- d. Strong acidic

B10. Which of the following is not a sources of acidity

- a. Leaching due to heavy rainfall

b. Illuviation

- c. Acid forming fertilizers
- d. Acid rain

B11. Which of the following is considered to be the production constraints pertaining to soil acidity

- a. Increased solubility and toxicity of Al, Mn and Fe
- b. Reduced availability of P and Mo
- c. Reduced microbial activity
- d. All the above**

B12. Which of the following state in India has predominant acid soils?

- a. Tamil Nadu
- b. Assam**
- c. Kerala
- d. Goa

Lime requirement of an acid soil may be defined as the amount of liming material that must be added to raise the pH to prescribed value

B13. Which method is used to determine the lime requirement in acid soil

- a. Shoemaker et al.,**
- b. Schoonover et al
- c. Smith
- d. Jenny et al,

B14. Which of the following is commonly used as liming material

- a. Commercial limestone
- b. Dolomite limestone
- c. Gypsum
- d. Both a and b**

B15. What will be the effect of liming on N fixation and mineralization

- a. Increases N fixation and Mineralization**
- b. Decreases N fixation and Mineralization
- c. Increases N fixation and decreases Mineralization
- d. Decreases N fixation and increases Mineralization

B16. Liming is effective soil ameliorant and what happens to the other nutrients in soil

- a. Reduces Al, Fe and Mn toxicity**
- b. Increases Al, Fe and Mn toxicity
- c. Decreases the base saturation
- d. Decreases the availability of P and MO

Soil with sufficient sulphides to become strongly acidic when drained are termed acid sulphate soils

B17. Acid Sulphate soils are generally called as

- a. White clays
- b. Cat clays**
- c. Regur
- d. Khadar

B18. Acid sulphate soils contain _____ horizon

- a. Natric
- b. Sodic
- c. Sulphuric**

d. Umbric

B19. The evidence of yellow colour in acid sulphate soils are characterised by _____

- a. Sulphide content
- b. Yellow colour
- c. Both a and b**
- d. Red colour

B20. What is the reclamation measures for Acid sulphate soils

- a. Liming
- b. Leaching
- c. Liming and leaching**
- d. Deep ploughing

(2017 Syllabus)	II B.Sc.,(Hons)Agriculture
SSAC 2242 PROBLEMATIC SOILS AND THEIR MANAGEMENT	IV semester

I. Choose the best answer

1. Which one of the following is an example of physical indicator of soil health

- (a) Soil pH
- (b) Soil Organic Carbon
- (c) Soil respiration
- (d) Soil Texture**

2. Lands which cannot be developed for Agriculture or Vegetation are called as _____

- (a) Culturable Wastelands
- (b) Unculturable wastelands**
- (c) Saline and Alkaline soils
- (d) Arid and Semi-arid soils

3. The Universal Soil Loss Equation (USLE) is given by

- (a) Wischmeier and Smith,1978**
- (b) Jethrotull
- (c) Hillgaurd
- (d) Bhumbla and Khare

4. Slow permeable soils are those having infiltration rates

- (a) less than 6 cm/day**
- (b) more than 6 cm/day
- (c) less than 3 cm/day
- (d) more than 20 cm/day

5. Shallow soils can be managed by growing crops of

- (a) Mango
- (b) Ber
- (c) Cashew
- (d) All the above**

6. Soil erosion extensively occurs in

- (a) Poorly aggregated soils
- (b) low humus soils
- (c) Higher percentage of silt and very fine sand
- (d) A**

7. “Brown Alkali” refers to

- (a) Presence of Sodium chloride
- (b) Presence of Sodium sulphates
- (c) Excess of nitrates
- (d) None of the above

8. The fraction of the irrigation water that must be leached through the root zone to control the soil salinity at any specified level is _____

- (a) Lime requirement
- (b) Leaching requirement
- (c) Gypsum requirement
- (d) None of the above

9. Which one of the following crop is highly salt tolerant?

- (a) Rice
- (b) Sugarcane
- (c) Sesbania
- (d) All the above

10. The parent material of Saline-Sodic soil is

- (a) Basalt
- (b) Granite
- (c) Limestone
- (d) Gneiss

11. The main principle for the reclamation of Sodic soil is

- (a) replace exchangeable sodium by calcium
- (b) replace calcium by sodium
- (c) replace sodium, potassium by Ca and Al
- (d) None of the above

12. The important sources of soil acidity is _____

- (a) Heavy rainfall
- (b) Acidic parent material
- (c) Humus and organic acids
- (d) All the above

13. The ultimate pH range of Lime requirement is

- (a) pH 6.0 to 7.0
- (b) pH 5.0 to 6.0
- (c) pH 4.0 to 5.0
- (d) None of the above

14. The important microbes involved in the formation of acid sulphate soils is _____

- (a) *Thiobacillus ferrooxidans*
- (b) *Rhizobium sp*
- (c) *Phosphobacteria sp*
- (d) *Azotobacter sp*

15. The main effect of salinity and alkalinity on soils are _____

- (a) Increase soil pH
- (b) D

- (c) Increase in unavailability of plant nutrients (d) All the above

16. The main effect of salinity and alkalinity on plants

- (a) Damage of plant roots and stem (b) Absorption of plant nutrients in low amount
(c) Toxic effects of ions and chlorosis in plants (d) All the above

17. The other name of Saline and Alkali soils are

- (a) USAR (b) BANJAR
(c) KALLAR and CHAUPAN (d) All the above

18. Sub soil hard pan is commonly found in _____

- (a) Red soils (b) Black soils
(c) Alluvial soil (d) Hilly soils

19. Gully erosion is an advanced stage of _____

- (a) Sheet erosion (b) Rill erosion
(c) Splash erosion (d) Stream channel erosion

20. Which one of the following chemical fertilizers produces acidity?

- (a) Ammonium chloride (b) Ammonium nitrate
(c) Ammonium sulphate (d) All the above

II. Fill in the blanks

1. Expand CSSRI _____

2. The other name of acid sulphate soils are _____

3. Expand NWDB _____

4. The Electrical Conductivity (EC) of saline soil is _____

5. The average annual loss of nutrients due to erosion is _____

6. A soil sample indicating pH=7.5, EC=4.8 dS/m, ESP=12, that may be categorised as _____ soils

7. "Akiochi" disease is caused by _____

8. Sodium Adsorption Ratio (SAR) is equal to _____

9. The chemical formulae of gypsum is _____

10. Universal Soil Loss Equation (USLE) is expressed as _____

11. Natural and manmade calamities such as erosion, deforestation occurring due to _____ and _____

12. "Sink holes" are the predominant features of _____ soil.

13. Surface crusting creates _____ in the rhizosphere.

14. _____ is defined as the continued capacity of soil to function as a vital living system, to sustaining the soil productivity.

15. _____ is a process of soil movement in a series of bounces or jump.

16. _____ soils are formed largely by the wea

17. Acid sulphate soils which have not been oxidised by exposure to air are known as _____
18. Basic slag and pressmud are superior to calcium oxide or carbonates for managing _____ soils.
19. The irrigation should be stopped 10 days before the harvest of rice crop in _____ soils.
20. _____ is due to presence of colloidal oxides of iron and aluminium in alfisols.

Fill in the blanks – Answer key

1. Central Soil Salinity Research Institute
2. Cat clays
3. National Wasteland Development Board
4. More than 4.0 dS/m
5. 2.4 million tonnes
6. Saline soils
7. H₂S (Hydrogen sulphide)
8. _____ Na⁺

$$\text{SAR} = \frac{\sqrt{(\text{Ca}^{2+} + \text{Mg}^{2+}) / 2}}{\text{Na}^+}$$

9. CaSO₄·2H₂O
10. A=RKLSCP
11. Rapid industrialization and urbanization
12. Black soils
13. Poor aeration
14. Soil health
15. Saltation
16. Calcareous soils
17. Potential Acid Sulphate Soils (PASS)
18. Acid soils
19. Fluffy Paddy soils
20. Surface crusting.

III .Match the following

- | | |
|------------------------|------------------|
| 41. Saline soil | i Podsolization |
| 42. Sodic soil | ii White alkali |
| 43. Acid sulphate soil | iii Black alkali |
| 44. Acid soil | iv Kari soil |

Ans : a) ii, i, iv and iii b) i,ii,iii and iv c) i, iii, ii and iv d)ii, iii, iv and i

- | | |
|---------------------------|-----------------------------------|
| 45. Fluffy paddy soil | i Raised and Sunken bed formation |
| 46. Slowly permeable soil | ii Rice- Rice cropping sequence |
| 47. Highly permeable soil | iii High bulk density |
| 48. Surface hard pan | iv 400kg stone roller |

Ans : a) iv, i, iii and ii b) i, ii,iii and iv c) i, iii, ii and iv d)**ii, iii, iv and i**

- | | |
|-------------------|---------------------|
| 49. Saltation | i Less than 0.05 mm |
| 50. Suspension | ii 0.05-0.5mm |
| 51. Surface creep | iii 0.1 mm |
| 52. Wind erosion | iv 0.5mm |

Ans : a) ii , i, iv , iii b) i,ii,iii and iv c) i, iii, ii and iv d)iv,iii, I and ii

- | | |
|------------------------|--------------------------------|
| 53. Saline soil | i Reverse osmosis |
| 54. Sodic soil | ii Dispersion of soil colloids |
| 55. Acid soil | iii Keep the area flooded |
| 56. Acid sulphate soil | iv Nutrients imbalance |

Ans : a) ii, iv ,i and iii **b) i,ii,iv and iii** c) i, iii, ii and iv d)iv,iii, I and ii

- | | |
|-------------------------|------------------------|
| 57. Soil structure | i Soil erosion |
| 58. Aggregate stability | ii Infiltration |
| 59. Bulk density | iii Seedling emergence |
| 60. Surface crust | iv Soil compaction |

Ans : a) ii, i , iv and iii b) i,ii,iii and iv c) i, iii, ii and iv d)iv,iii, I and ii

IV. Identify the correct/ Incorrect statement

61. Identify the correct statement

a. The ravinous land are classified into shallow, medium and deep ravine lands	b. The ravinous land are classified into degraded forest lands	c. The ravenous land are classified into waterlogged and inundated lands	d. The ravinous lands are mined out area
--	--	--	--

62. Identify the incorrect statement

a. Soil compaction decrease water holding capacity in soil	b. Soil compaction managed by Chiesel ploughing technology	c. Sinking of drought animals and labours is one of the problems in fluffy paddy soil	d. Fluffy paddy soil is managed by stone roller technology
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63. Identify the correct statement in regarding to soil quality indicators

a. Soil texture retain and transport of water and nutrients	b. Soil microbes act as catalyst of soil respiration	c. Soil organic carbon play a role of soil fertility and stability	d. Soil pH vital role of enzymatic activity
--	--	---	---

64. Identify the incorrect statement

a. Saline soils having amount of soil moisture is low	b. Saline soils having wilting coefficient is very high.	c. Saline soil having pH is >8.5, ESP>15 and EC will be >4 dS/m	d. Saline soil having more than 2% of soluble salts
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65. Identify the incorrect statement

a. Fluffy paddy soil having low bulk density and very rapid hydraulic conductivity	b. Slowly Permeable soil having high clay content and high infiltration rate	c. Surface crusting in soil cause high infiltration and reduce run off	d. Sub soil hard pan is characterized by high bulk density and low in water holding capacity
---	--	---	--

66. Identify the incorrect statement

a. Soil salinity are characterized by total soluble salts	b. Soil salinity are characterized by osmotic pressure	c. Soil salinity are characterized by soil texture	d. Soil salinity are characterized by Specific ion effect
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67. Identify the correct statement

a. Rice is preferred crop in sodic soil	b. Guava is highly sodic tolerant crop	c. Pomegranate is very sensitive to soil sodicity	d. Mango is medium tolerant crop to soil sodicity
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68. Identify the correct statement

a. Earthworms play a major role in modifying the physical structure of soil	b. Organic amendment application, crop rotation and cover crops can be used to reduce the enzyme activity in soil	c. Reduced soil respiration rate indicate that organic carbon status in soil	d. Oxygen is released from the soil surface is called as microbial respiration
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69. Identify the incorrect statement

a. In sodic soil, Soil ion adsorbed by clay colloids cause deflocculation and dispersion of clay	b. Sodic soil having poor aeration and drainage	c. Sodic soil having high sodium bicarbonate and sodium bicarbonate	d. Sodic soil having poor hydraulic conductivity and poor microbial activity
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70. Identify the correct statement

a. The main soil forming process in acid soil is podsolization	b. The main soil forming process in acid soil is calcification	c. The main soil forming process in acid soil is salinization	d. The main soil forming process in acid soil is Solonization.
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71. Identify the correct statement

a. Slowly permeable soil are managed by lime or gypsum @ 2t/ha may be uniformly spreaded	b. Slowly permeable soil are managed by resistant crops like cowpea can be grown	c. Slowly permeable soil are managed by when the soil is at optimum moisture regime, ploughing it to be done.	d. Slowly permeable soil are managed by formation of ridges and furrows
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72. Identify the incorrect statement

a. Sodic soil formed is due to the process of salinization	b. Dispersion of soil colloids is the major constraints in sodic soil	c. Gypsum is the amendment used for reclamation of sodic soil	d. The sodic soil is managed by leaching of soluble salts
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73. Identify the correct statement

a. Surface crusting is generally occurred in red soil	b. Surface crusting is generally occurred in black soil	c. Surface crusting is generally occurred in Alluvial soil	d. Surface crusting is generally occurred in Peat soil
--	---	--	--

74. Identify the correct statement

a. Wastelands are defined as the gullies are formed as a result of localized surface run off	b. Wasteland is formed by cleaning and burning of forests	c. Wasteland is an barren or uncultivated land	d. Wasteland land is formed by industrial pollution
--	---	---	---

75. Identify the incorrect statement

a. Acid soil is a base unsaturated soil	b. Continuous application of phosphatic fertilizers leads to soil acidity	c. The high concentration of carbon di oxide in soil increase soil acidity by the formation of carbonic acid	d. Decomposition of organic matter is increases the soil acidity
---	--	--	--

76. Identify the correct statement

a. Lime stone and dolomite are mostly used amendment for reclamation of saline soil	b. Saline soil are managed by application of paper slugde from paper mills	c. Saline soils are reclaimed by leaching of soluble salts	d. Application of pressmud are mostly used amendment for reclamation of saline soil
---	--	---	---

77. Identify the in correct statement

a. Lime reactions in soil depends upon the nature and fineness of liming materials	b. Oxides of lime is called as slaked lime	c. Hydroxides of lime is called as burned lime	d. Gypsum is considered as liming material for the reclamation of acid soil
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78. Identify the correct statement of major factors affecting soil quality are

a. Development of salinity and alkalinity in soils	b. Comparative assessment	c. Dynamic assessment	d. Pedotransfer functions
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79. Identify the incorrect statement

a. Effects of over liming in acid soil cause boron toxicity in plants	b. When excessively large amount of lime will be increased Phosphorous and Potassium availability	c. Effects of overliming in acid soil will be inhibited root development	d. Effects of overliming cause fungal disease in acid soil
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80. Identify the correct statement

a. Soil crusting is generally occurred in Alfisols	b. Soil crusting is generally occurred in Vertisols	c. Soil crusting is generally occurred in Inceptisols	d. Soil crusting is generally occurred in Gellisols
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Year : 2019		(2017Syllabus)		Time : 1 hr	
Semester : IV		SSAC 242 Problematic soils and their management (2+0)		Max. Marks: 60	
PART-A (Answer All questions)				[80 x 0.5 = 40]	
Choose the correct answer (kindly bold the answer keys)					
1.	_____ is the capacity of a soil to function within ecosystem and land use boundaries, to sustain productivity, maintain environmental quality, and promote plant and animal health				
	A)	Soil health	B)	Soil quality	
	C)	Soil productivity	D)	Soil fertility	
2.	Who defined the term Soil quality? _____				
	A)	Jenny	B)	Doran and Parkin	
	C)	Joffer	D)	Dokuchaev	
3.	_____ is the ability of a system to return after disturbance to a new dynamic equilibrium or ability of a soil to resist adverse changes				
	A)	Soil resilience	B)	Soil health	
	C)	Soil quality	D)	Soil fertility	

4.	_____ is the indicator of physical properties of soil	
	A) CEC	B) Organic matter
	C) Bulk density	D) Enzymes
5.	_____ is defines as the continued capacity of soil to function as a vital living system	
	A) Soil health	B) Soil quality
	C) Soil capacity	D) Soil productivity
6.	_____ is a primary attribute of soil quality assessment	
	A) Enzymes	B) Nutrients
	C) Earthworms	D) Soil organic matter
7.	_____ is an example of soil chemical properties indicator	
	A) CEC	B) porosity
	C) Bulk density	D) Aggregate stability
8.	The proposed minimum data set of physical indicator that indicates how well water and chemicals are retained and transported is _____	
	A) Bulk density	B) Particle density
	C) Soil texture	D) Soil structure
9.	An example of biological quality indicator	
	A) Soil organic matter	B) C:N ratio
	C) Enzymes	D) All the above
10.	_____ defines the level of microbial activity	
	A) Soil respiration	B) C: N ratio
	C) Mineralisation	D) Enzyme activity
11.	Economically unproductive and unstable lands are called as _____	
	A) Barren lands	B) Marshy lands
	C) Steep lands	D) Waste lands
12.	In India, which state is having the larger area of wasteland _____	
	A) Madhya Pradesh	B) Rajasthan
	C) Tamil Nadu	D) Kerala
13.	A collection of dunes is called as _____	
	A) Dune belt	B) Dune group
	C) Dune order	D) Dune series
14.	In a sand dune _____ is the side, where the wind is blowing and pushing the material	
	A) Slip face	B) Lee side
	C) Windward side	D) Stoss side
15.	In a sand dunes _____ is simply the side without wind	
	A) Windward side	B) Slip face
	C) Lee side	D) Stoss side
16.	Saline and alkali soils are otherwise called as _____	
	A) Hydromorphic soil	B) Halomorphic soils
	C) Calcimorphic soils	D) None of the above
17.	The process of formation of degraded alkali soil is called as	
	A) Salinization	B) Solodization
	C) Solod	D) alkalization
18.	In _____ type of wind erosion the soil particle	

	move by rolling and sliding action along the surface of soil			
	A)	Suspension	B)	Saltation
	C)	Ravine	D)	Surface creep
19.	The universal soil loss equation is given by _____			
	A)	Smith	B)	Leibig
	C)	Wischmeier and Smith	D)	Bray
20.	The problem of slow soil permeability is due to			
	A)	Low clay content	B)	High clay content
	C)	Low Fe ³⁺ and Al ³⁺ oxides	D)	High Fe ³⁺ and Al ³⁺ oxides
21.	To overcome the constraints caused by sub soil hard pan _____ methodology is done			
	A)	Chisel ploughing	B)	Disc ploughing
	C)	Zero tillage	D)	Minimum tillage
22.	The soil under continuous flooding and submergence for rice cultivation are always in a state of flux and lose soil mechanical strength, these are called as _____			
	A)	Theri soils	B)	Fluffy paddy soils
	C)	Highly permeable soils	D)	Marshy lands
23.	Identify the management technology for highly permeable soils a. After good rainfall or irrigation, the soil should be rolled 10 times with 400 kg stone roller b. Application of clay soil upto level of 100 t ha ⁻¹ c. Crop rotation with green manure crops d. Application of organics			
	A)	b only	B)	Both a and d
	C)	c only	D)	All the above
24.	The soil order which is more prone to surface crusting			
	A)	Alfisol	B)	Vertisol
	C)	Histosol	D)	Mollisol
25.	Fluffy paddy soils will have _____			
	A)	High bulk density	B)	Low bulk density
	C)	Large pores	D)	None
26.	The physical constraints that is formed when dispersion of soil particles is followed by rapid drying			
	A)	Soil compaction	B)	Aggregation
	C)	Surface crusting	D)	None
27.	_____ crust are formed after sealing of the surface by a structural crust and concentration of detached particle from eroded clods			
	A)	Slaking crust	B)	Cryptogamic crust
	C)	Erosional crust	D)	Depositional crust
28.	_____ crust are formed from the erosion of sieving crust			
	A)	Slaking crust	B)	Cryptogamic crust
	C)	Erosional crust	D)	Depositional crust
29.	_____ is hill of loose sand built by Aeolian process or the flow of water			
	A)	Gully	B)	Crust
	C)	Dune	D)	Soil aggregates
30.	A special type of red sandy dunal soils found in Ta			

	A)	Terai soils	B)	Theri soils	
	C)	Marshy soils	D)	Saline soils	
31.	The sub soil hard pan is characterized by high bulk density of _____				
	A)	> 1.8 Mg m⁻³	B)	< 1.3 Mg m ⁻³	
	C)	1.3 -1.6 Mg m ⁻³	D)	1.3 Mg m ⁻³	
32.	An suitable tree crop that can be grown in shallow soils _____				
	A)	Guava	B)	Lime	
	C)	Sapota	D)	Cashew	
33.	Name the artificial soil conditioner used to control soil crusting				
	A)	Polyvinyl alcohol	B)	Acetic acid	
	C)	Acroline	D)	Elemental sulphur	
34.	The soil particles (silty texture) that blown by wind is known as _____				
	A)	Alluvium	B)	Colluvium	
	C)	Aeolian	D)	Loess	
35.	_____ is defined as the detachment and transportation of soil mass from one place to another through action of wind and water				
	A)	Soil dispersion	B)	Soil aggregation	
	C)	Soil erosion	D)	None	
36.	The erosion caused by the disturbances of people and due to increasing population is called _____				
	A)	Geological erosion	B)	Accelerated erosion	
	C)	Rill erosion	D)	Sheet erosion	
37.	_____ erosion results from soil splash caused by the impact of falling rain drops				
	A)	Rill	B)	Rain drop splash	
	C)	Gully	D)	Sheet	
38.	_____ is the removal of soil by running water, with the formation of channels				
	A)	Rill erosion	B)	Stream channel erosion	
	C)	Sheet erosion	D)	Gully erosion	
39.	The soil particles of which size generally move and jump in the process of saltation				
	A)	1-2 mm	B)	0.005 to 0.05mm	
	C)	0.5 to 1mm	D)	0.05 to 0.5mm	
40.	_____ soils are completely saturated with water for long time and give distinctive gley horizons resulting from oxidation and reduction				
	A)	Acid sulphate soil	B)	Submerged soil	
	C)	Sodic soil	D)	Saline soil	
41.	Which of the following is true in regard to submerged soils a. partially oxidized A horizon b. A mottled zone in which oxidation and reduction alternate c. A permanently reduced zone which is bluish in colour d. Depletion of oxygen and accumulation of CO ₂				
	A)	Both a and b	B)	c only	
	C)	Both c and d	D)	All the above	
42.	_____ refers to breaking down of soil aggregates at near saturation into ultimate soil particles				

	A)	Puddling	B)	Ploughing	
	C)	Tillage	D)	None	
43.	_____ is the process of clay decomposition and transformation under the influence of periodic reduction of iron oxides to ferrous ion				
	A)	Humification	B)	Ferrollysis	
	C)	Podsolisation	D)	Laterisation	
44.	The type of clay mineral which is more prone to dispersion				
	A)	kaolinite	B)	Chlorite	
	C)	Halloysite	D)	Montmorillonite	
45.	_____ are termed as base unsaturated soils which has got enough of adsorbed exchangeable H^+ ions				
	A)	Acid soil	B)	Saline soil	
	C)	Acid sulphate soil	D)	Sodic soil	
46.	The acidity developed due to the H^+ ion and Al^{3+} ions concentration of the soil solution is termed as _____				
	A)	Potential acidity	B)	Active acidity	
	C)	Exchange acidity	D)	Total acidity	
47.	_____ may be defined as the acidity developed due to the adsorbed H^+ and Al^{3+} ions on the soils colloids.				
	A)	Total acidity	B)	Active acidity	
	C)	Reserve acidity	D)	Exchange acidity	
48.	The problem of soil acidity is more prevalent in the regions of _____				
	A)	Low rainfall Zone	B)	High rainfall zone	
	C)	Arid Zone	D)	Semi-arid zone	
49.	_____ is the amendment used to reclaim acid soil				
	A)	Lime	B)	Gypsum	
	C)	Sulphuric acid	D)	Elemental sulphur	
50.	The amount of lime required to be added to raise the pH of the soil to desired value is known as _____				
	A)	a only	B)	b only	
	C)	c only	D)	Lime requirement	
51.	Due to the toxic effect of Fe^{2+} and Mn^{2+} ions, a physiological disease of rice found in submerged soils is known as - _____				
	A)	Root rot	B)	Browning disease	
	C)	Blight disease	D)	<i>Itai Itai</i>	
52.	The buffer method used for the determination of lime requirement of an acid soil is given by _____				
	A)	Joffer	B)	Schoonover	
	C)	Shoemaker	D)	Jenny	
53.	Soil with sufficient sulphides to become strongly acidic when drained and aerated enough for cultivation are termed as _____				
	A)	Acid soil	B)	Acid sulphate soil	
	C)	Saline soil	D)	Sodic soil	
54.	Acid sulphate soils are otherwise called as _____				
	A)	White clay	B)	Black clay	
	C)	Cat clays	D)	China clay	
55.	Under strong acidity in acid sulphate soils hydrogen sulphide gas are often formed in lowland rice soils causing ----- disea				

	A)	<i>Itai Itai</i> disease	B)	Blight disease	
	C)	Browning disease	D)	Akiochi disease	
56.	_____ is defines as the acid neutralizing capacity of an agricultural liming material expressed as weight percentage of calcium carbonate				
	A)	Calcium carbonate equivalent	B)	Lime requirement	
	C)	Gypsum requirement	D)	Lime factor	
57.	Reclamation of acid sulphate soil can be done by _____				
	A)	Keeping the area flooded	B)	Controlling of water table	
	C)	Limning and Leaching	D)	All the above	
58.	Acid sulphate soil have an pH of _____				
	A)	8.5	B)	6.5	
	C)	4	D)	7.5	
59.	The neutralizing value of calcium oxide _____				
	A)	179	B)	136	
	C)	100	D)	86	
60.	Salt affected soils are mostly formed in _____ regions				
	A)	Arid and semi arid regions	B)	High rainfall areas	
	C)	Tropical	D)	None of the above	
61.	The neutralizing value of calcite. _____				
	A)	136	B)	179	
	C)	86	D)	100	
62.	The saline soils are otherwise called as _____				
	A)	Solonetz	B)	Solonochak	
	C)	Sodic soil	D)	Solod	
63.	In soil the problem caused due to more amount of soluble salts _____				
	A)	Acidity	B)	Sodicity	
	C)	Salinity	D)	Alkalinity	
64.	In soil the problem caused due to more amount of exchangeable Na ⁺ _____				
	A)	Acidity	B)	Sodicity	
	C)	Salinity	D)	None	
65.	Alkali soils are otherwise called as _____				
	A)	Sodic	B)	Solod	
	C)	Solonetz	D)	All the above	
66.	The pH of saline soil is usually _____				
	A)	8-8.5	B)	7	
	C)	More than 8.5	D)	5.5	
67.	The pH of sodic soil is _____				
	A)	8-8.5	B)	6	
	C)	More than 8.5	D)	5.5	
68.	_____ soil is defined as a soil having an electrical conductivity of greater than 4 dSm ⁻¹ and ESP greater than 15 with pH above 8.5				
	A)	Saline alkali soil	B)	Saline soil	
	C)	Non saline alkali	D)	Degraded alkali soil	
69.	Due to extensive leaching some part of exchangeable _____				

	replaced by H ⁺ ions and may cause slight acidity with unstable structure. The resulting soil is _____		
	A) Saline soil	B) Acid soil	
	C) Acid sulphate soil	D) Degraded alkali soil	
70.	The formula to calculate SAR (Sodium absorption Ratio) _____		
	A) $\frac{Na^+}{\sqrt{\frac{Ca^{2+} + Mg^{2+}}{2}}}$	B) $\frac{(Na^+)^2}{\sqrt{Ca^{2+} + Mg^{2+}}}$	
	C) $\frac{Na^+}{Ca^{2+} + Mg^{2+}}$	D) None	
71.	The sodium (Na ⁺) ion adsorbed by clay colloids causes _____ of clay		
	A) Aggregation	B) Surface crusting	
	C) Coagulations	D) Dispersion	
72.	Identify the correct statement in regard to reclamation of saline soil		
	a. Leaching with good quality irrigation water		
	b. Addition of amendments like gypsum and Elemental sulphur		
	c. Addition of liming materials		
	d. Addition of basic fertilizers like Sodium nitrate		
	A) b only	B) Both a and d	
	C) a only	D) Both c and d	
73	An example of salt tolerant crop		
	A) Beans	B) Pulses	
	C) Raddish	D) Sugarbeet	
74.	Reclamation of Sodic soil is done by applying		
	A) Lime	B) Sodium nitrate	
	C) Gypsum	D) Ammonium nitrate	
75	Unit of CEC		
	A) C mol (p⁺) kg⁻¹ of soil	B) C mol (p ⁻) kg ⁻¹ of soil	
	C) dSm ⁻¹	D) C mol (p ⁺) ² kg ⁻¹ of soil	
76.	Gypsum requirement formula _____		
	A) $\frac{ESP(Initial) - ESP(Final) \times CEC}{100}$	B) $\frac{ESP(Initial) - ESP(Final)}{CEC} \times 100$	
	C) $\frac{ESP(Initial) - ESP(Final) \times CEC}{100}$	D) $\frac{ESP(Initial) - ESP(Final)}{CEC}$	
77.	Gypsum requirement method is given by		
	A) Jenny	B) Shoemaker	
	C) Joffer	D) Schoonover	
78	Calculate the leaching requirement (LR) of an irrigation water having electrical conductivity of 3 dSm ⁻¹ where the electrical conductivity of drainage water is 8 dSm ⁻¹		
	A) 35.5%	B) 60%	
	C) 37.5%	D) 45.5%	
79.	An example of moderately tolerant crop is _____		
	A) Barley	B) sugar beet	
	C) Greengram	D) Maize	
80.	The amendment Iron sulphate estimated efficiencies used to reclaim sodic soils compared to Gypsum		

A)	1.62	B)	1.00
C)	0.57	D)	0.18

PART-B
(Answer **All** questions)

[10 x 2 = 20]

Match The following (kindly bold the answer keys)

81.

1	pH of acid soil	a	8.5-10.0
2	pH of Saline soil	b	>8.5
3	pH of sodic soil	c	4-6
4	pH of saline alkali soil	d	8-8.5

A)	1-c, 2-d, 3-a, 4-b	B)	1-c, 2-a, 3-d, 4-b
C)	1-d, 2-a, 3-c, 4-b	D)	1-b, 2-a, 3-d, 4-c

82.

1	EC of saline soil	a	<4 dSm ⁻¹
2	EC of sodic soil	b	Leaching requirement
3	Acid soil	c	>4 dSm ⁻¹
4	Saline soil	d	Lime requirement

A)	1-c, 2-a, 3-b, 4-d	B)	1-c, 2-d, 3-a, 4-b
C)	1-c, 2-a, 3-d, 4-b	D)	1-b, 2-a, 3-d, 4-c

83.

1	ESP of saline soil	a	<13
2	ESP of Sodic soil	b	>15
3	SAR of saline soil	C	>13
4	SAR of Sodic soil	d	<15

A)	1-d, 2-a, 3-b, a-c	B)	1-c, 2-b, 3-a, 4-d
C)	1-c, 2-a, 3-b, 4-d	D)	1-d, 2-b, 3-a, 4-c

84.

1	Gypsum	a	0.18
2	Elemental sulphur	b	0.57
3	Iron sulphate	c	1.00
4	Sulphuric acid	d	1.62

A)	1-a, 2-c, 3-d, 4-b	B)	1-c, 2-a, 3-d, 4-b
C)	1-d, 2-a, 3-c, 4-b	D)	1-c, 2-b, 3-a, 4-d

85.

1	Calcium hydroxide	a	108.7
2	Basic slag	b	136
3	Dolomite	c	100
4	Calcite	d	86

A)	1-d, 2-b, 3-c, 4-a	B)	1-a, 2-c, 3-d, 4-b
C)	1-b, 2-d, 3-a, 4-c	D)	1-c, 2-a, 3-b, 4-d

86.

1	Sheet erosion	a	Formation of narrow channel
2	Rill erosion	b	Scouring of material and cutting of banks
3	Gully erosion	c	Formation of strong channels
4	Stream channel erosion	d	Removal of uniform layer of soil surface

A)	1-c, 2-d, 3-b, 4-a	B)	1-c, 2-b, 3-a, 4-d
C)	1-d, 2-b, 3-a, 4-c	D)	1-d, 2-a, 3-c, 4-b

87.

1	Slaking crust	a	Crust made of algae, fungi, lichens etc
2	Coalescing crust	b	More impact of sandy soil
3	Sieving crust	c	Formed when

	4	Cryptogamic crust	d	Impact of rain drops	
A)		1-c, 2-d, 3-a, 4-b	B)	1-b, 2-c, 3-a, 4-d	
C)		1-d, 2-c, 3-b, 4-a	D)	1-d, 2-c, 3-b 4-a	
88.					
	1	R	a	Soil erodibility factor	
	2	K	b	Slope gradient factor	
	3	L	c	Rainfall factor	
	4	S	d	Slope length factor	
A)		1-c, 2-d, 3-a, 4-b	B)	1-c, 2-a, 3-d, 4-b	
C)		1-b, 2-a, 3-c, 1-d	D)	1-b, 2-c, 3-a, 4-d	
89.					
	1	Highly salt resistant crop	a	Raddish	
	2	Moderately salt resistant crop	b	Sugarbeet	
	3	Low salt resistant crop	c	0.36X EC	
	4	Osmotic pressure	d	Wheat	
A)		1-b, 2-d, 3-a, 4-c	B)	1-c, 2-d, 3-a, 4-b	
C)		1-c, 2-a, 3-d, 4-b	D)	1-d, 2-a, 3-b, 4-c	
90.					
	1	Very small gullies	a	More than 9 m	
	2	Medium gullies	b	Deep upto 3 m	
	3	Deep and narrow gullies	c	Poorly aggregated soils	
	4	Erosion	d	Deep between 3 to 9 m	
A)		1-b, 2-a, 3-d, 4-c	B)	1-b, 2-d, 3-a, 4-c	
C)		1-c, 2-a, 3-b, 4-d	D)	1-c, 2-a, 3-d, 4-b	

SSAC 242 Problematic soils and their management

A. Choose the best answer

1. Soil quality is generally enhanced by greater _____.

- organic matter content
- stability of soil structure
- water-holding capacity
- all of the above

Ans: d

2. _____ provides a single number by which one soil can be compared to other soils with regard to its capacity to achieve a defined management goal, such as the protection of broader environmental quality.

- A scoring function
- A soil quality index
- Weighting factor
- Ecological function

Ans: b

3. Which of the following indicators of soil quality would be useful changes due to soil management over periods of just a few years?

- soil mineral contents

- b. organic matter content
- c. soil texture
- d. climate characteristics

Ans: b

4. A soil with a high CEC and pH buffering capacity would likely exhibit a high degree of _____ with regard to the effects of acid precipitation.

- a. resilience
- b. soil quality
- c. sensitivity
- d. resistance

Ans: d

5. Food production, carbon sequestration, water supply, disease mitigation, and habitat for diverse organisms are all examples of _____.

- a. ecological services provided by soils
- b. soil quality indicators
- c. soil quality scoring functions
- d. all of the above

Ans: a

6. Reactive carbon would likely exhibit a high degree of _____ with regard to soil function

- a. Sustain biological diversity, activity and productivity "D"
- b. Regulate and partition water and solute flow "W"
- c. Filter, buffer, degrade, detoxify organic and inorganic materials "F"
- d. Store and cycle nutrients and carbon "N"

Ans: c

7. Which of the following is an important soil function related to crop production

- a. Infiltration and storage of water
- b. Pest and weed suppression
- c. Climatic condition
- d. all of the above
- e. Both a and b

Ans: e

8. Which of the following is not a soil quality biological indicator properties?

- a. Organic matter content
- b. Microbial biomass carbon
- c. Microbial biomass nitrogen
- d. Mineralisable nitrogen

Ans: d

9. In India, the total area under degraded and waste land was

- a. 80 M ha
- b. 114.01 M ha
- c. 90 M ha
- d. 86.2 M ha

Ans: b

10. Which one of the following is the serious category of wasteland

- a. Salinized soil
- b. Degraded pasture/Grazing land
- c. Mining / Industrial waste land
- d. Land with or without scrub

Ans: a

11. In Sands- Desertic Coastal wasteland, the sand deposit found in a layer of _____ on the surface of soil

- a. 7 to 8 cm
- b. 10 to 15 cm

- c. 15 to 20 cm
- d. 9 to 12 cm

Ans: a

12. Important soil properties that encourage the crust formation

- a. Low P content
- b. High exchangeable Na
- c. Heavy rainfall
- d. Low soil pH

Ans: b

13. Chiesel ploughing at 0.5 m width in criss cross at 0.5m depth once in 2-3 years is the management for

- a. Soil compaction
- b. Sub soil hard pan
- c. Sand dunes
- d. Slow permeable soil

Ans: b

14. Rill erosion form channel of size

- a. 0.3-0.5 m
- b. <0.3 m
- c. >0.5 m
- d. 0.2-0.4 m

Ans: b

15. Which of the following is the characteristic of V shaped gully

- a. Flow velocity is low
- b. Catchment area contributing the runoff is large
- c. Longitudinal gradient of channel is parallel to slope of land
- d. The gully make the contour cultivation difficult

Ans:d

16. Specification of small gullies

- a. Upto 3 m deep, bed with >18 m, sides slopes 8-15 %
- b. Upto 3 m deep, bed with not > 18m, side slopes vary
- c. Upto 3 m deep, bed with <18 m, sides slopes 8-15 %
- d. Upto 3 m deep, bed with > 18m, side slopes vary

Ans:a

17. In wind erosion control measure, the tilled strip spacing vary with

- a. Soil structure
- b. Soil texture
- c. Soil organic matter
- d. Soil pH

Ans: b

18. Reduction _____ and Oxidative _____ as the soil forming processes characteristics of paddy soil

- a. Illuviation and Eluviation
- b. Eluviation and Laterization
- c. Eluviation and Illuviation
- d. Laterization and Illuviation

Ans:c

19. In Flooded soil, the soil pH

- a. Increase
- b. Decrease
- c. No change
- d. Altering towards normal

Ans:d

20. In humid region, the soil pH was

- a. Acidic in nature
- b. Alkaline in nature
- c. Neutral
- d. None of the above

Ans: c

21. Soil pH in Acid sulphate soil

- a. <2
- b. <3
- c. <4
- d. <5

Ans:c

22.Strong acidity in acid sulphate soil results in toxicities of

- a. Al and Fe
- b. Cu and Zn
- c. Al and Zn
- d. Cr and Fe

Ans:a

23. Highly acid tolerant crops are

- a. Potato
- b. Barley
- c. Wheat
- d. Carrot

Ans: b

24. Liming material used for acid soil

- a. Quick Lime
- b. Slaked Lime
- c. Wood ash, Ground Oyster Shell
- d. All of the above

Ans:d

25. The term Solonetz is used to denote

- a. Saline soil
- b. Alkali soil
- c. Saline-Alkali soil
- d. Acid soil

Ans:b

26. White alkali soil is also called as

- a. Alkali soil
- b. Saline soil
- c. Saline-alkali soil
- d. Sodic soil

Ans:b

27. Gullies are linear incision channels of atleast ____m width and ____m depth

- a. 0.3 and 0.3
- b. 0.4 and 0.4
- c. 0.5 and 0.5
- d. 0.2 and 0.2

Ans:a

28. In wind erosion process, the highest percentage of erosion accounted in

- a. Saltation
- b. Suspension
- c. Soil creep
- d. None of the above

Ans:c

29. In Universal Soil Loss equation, K factor denotes

- a. Rainfall factor

- b. Erodibility factor
- c. Support practice factor
- d. Crop management factor

Ans: b

30. In submerged soil a permanently reduced zone shows which colour

- a. white
- b. brown
- c. Dark blue
- d. Bluish green

Ans: d

31. Active acidity develops due to _____ ions on the soil colloids

- a. H^+ and Fe^{2+}
- b. Al^{3+} and Fe^{2+}
- c. H^+ and Al^{3+}
- d. Al^{3+} and Cr^+

Ans: c

32. Efficiency of liming materials can be judged by

- a. Neutralizing value
- b. Purity of liming material
- c. Degree of fineness of liming materials
- d. All of the above

Ans: d

33. In acid sulphate soil, the most active oxidizing bacteria present

- a. Thiobacillus plumbophilus,
- b. Acidithiobacillus thiooxidans.
- c. Thiobacillus ferrooxidans
- d. All of the above

Ans: c

35. During submergence, the sulphates in the water reduced to

- a. Sulphur
- b. Zinc sulphate
- c. Sulphides
- d. Magnesium sulphate

Ans: c

36. Neutralizing value of Calcium oxide is

- a. 100
- b. 108.7
- c. 136
- d. 179

Ans: d

37. Liming material passing through a 60 mesh sieve have

- a. 100
- b. 60
- c. 20
- d. 80

Ans: a

38. _____ is the intermediate between sheet and gully erosion

- a. Splash erosion
- b. Bank erosion
- c. Rill erosion
- d. Stream channel erosion

Ans: c

39. Characteristics of Saline- alkali soil are

- a. $SAR < 13$, $ESP < 15$, and $pH < 8.5$
- b. $SAR > 13$, $ESP > 15$, and $pH 8.5-10.0$

- c. SAR>13, ESP>15, and pH >8.5
- d. SAR<13, ESP>15, and pH 6-8.5

Ans: c

40. Soil physical properties affected by Sodic soil was

- a. Dispersion
- b. reduced hydraulic conductivity
- c. infiltration
- d. All of the above

Ans: a

41. _____ is a process of soil movement of particle size 0.5 to 2 mm size

- a. Saltation
- b. Suspension
- c. Soil creep
- d. Splash

Ans: b

PART-A				[40 x 0.5 = 20]	
(Answer All questions)					
Choose the correct answer					
1.refers to the ability of soil aggregates to resist disintegration when disruptive forces associated with tillage and water or wind erosion are applied.				
	A)	Aggregate stability	B)	Soil Texture	
	C)	Soil Structure	D)	Bulk density	
2.	Aggregation and stability of soil aggregates are affected by				
	A)	Clay	B)	Ca and Na	
	C)	Iron oxide	D)	All of them	
3.is the maximum amount of plant available water a soil can provide				
	A)	Soil Structure	B)	Available water capacity	
	C)	Bulk density	D)	Aggregate stability	
4.	Available water capacity is the water held in soil between itsand				
	A)	Aggregate Stability & Bulk Density	B)	Infiltration & Soil Crusts	
	C)	Field capacity & Permanent wilting point	D)	Soil Structure and Macropores	
5.	Salt concentration increases as soil water				
	A)	Increases	B)	Decreases	
	C)	First increase and Decrease	D)	First Decrease and Increase	
6.is the breakdown of large, air-dry soil aggregates into smaller sized microaggregates when they are suddenly immersed in water.				
	A)	Slaking	B)	Infiltration	
	C)	Bulk density	D)	Soil Texture	
7.	Slaking processand increase runoff and erosion.				
	A)	Reduce Infiltration	B)	Increase Infiltration	
	C)	Improve structure	D)	Decrease aggregate stability	
8.	A narrow deep gash formed as a result of localized and concentrated run off by running water is called.....				
	A)	Gully	B)	Erosion	
	C)	Ravines	D)	All of them	
9.	Very deep (>9m) and wide gullies with steep sides are known as				
	A)	Gully	B)	Erosion	
	C)	Ravines	D)	All of them	
10.	These lands have slopes from 3 to 10 which are almost unsuitable for crop cultivation due to very high degree of slope which hinders the performance of agricultural operations.				
	A)	Upland	B)	Low land	
	C)	Garden land	D)	Wetland	
11.soil are submerged in water				
	A)	Waterlogged	B)	Marshy la	

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	C)	Dry land	D)	A and B	
12.are the lands which are capable or have the potential for the development of vegetative cover and are not being used due to different constraints of varying degrees.				
	A)	Cultivable wastelands	B)	Uncultivable wastelands	
	C)	Steep sloping area	D)	All of them	
13.are the lands that cannot be under vegetative cover				
	A)	Cultivable wastelands	B)	Uncultivable wastelands	
	C)	Grazing land	D)	All of them	
14.	Cultivable waste lands are.....				
	A)	Gullied and ravenous land	B)	Undulating upland with and without scrub	
	C)	Surface waterlogged and marshy land	D)	All of them	
15.	Uncultivable waste lands are.....				
	A)	Barren rock/ Stony waste/ Sheet rock area	B)	Steep sloping area	
	C)	Snow covered and/ or glacial area	D)	All of them	
16.	Sand desertic or Costal lands are.....				
	A)	Cultivable waste lands	B)	Uncultivable waste labds	
	C)	Waterlogged lands	D)	Snow covered area	
17.	Salt affected and alkaline soil are.....				
	A)	Cultivable waste lands	B)	Uncultivable waste labds	
	C)	Waterlogged lands	D)	Snow covered area	
18.	Shifting cultivation areas are.....				
	A)	Uncultivable waste lands	B)	Cultivable waste lands	
	C)	Snow covered area	D)	Steep sloping area	
19.	Degraded forest lands are.....				
	A)	Uncultivable waste lands	B)	Cultivable waste lands	
	C)	Sheet rock area	D)	Steep sloping area	
20.	Degraded pasture/ grazing lands are.....				
	A)	Cultivable waste lands	B)	Stony waste land	
	C)	Steep sloping area	D)	Sheet rock area	
21.	Degraded non-forest plantation lands are.....				
	A)	Cultivable waste lands	B)	Sheet rock area	
	C)	Steep sloping area	D)	Snow covered area	
22.	Mining/ industrial wastelands are.....				
	A)	Uncultivable waste lands	B)	Cultivable waste lands	
	C)	Sheet rock area	D)	Steep sloping area	
23.	Snow covered land or glacial area are.....				
	A)	Uncultivable waste lands	B)	Cultivable waste lands	
	C)	Sheet rock area	D)	Steep sloping area	

24. soils are those having infiltration rates less than 6 cm/day			
	A)	Slow permeable	B)	Excessively permeable
	C)	Fluffy paddy soils	D)	All of them
25	Slow permeable due to high content of the soil			
	A)	Sand	B)	Clay
	C)	Silt	D)	A and B
26.soils are those having high amount of sand exceeding 70 percent and unable to retain nutrient and water			
	A)	Slow permeable	B)	Excessively permeable
	C)	Fluffy paddy soils	D)	All of them
27.	Sinking of drought animals and labourers during puddling in soil			
	A)	Slow permeable	B)	Excessively permeable
	C)	Fluffy paddy soils	D)	All of them
28	Fluffy paddy soils is due tocropping sequence cultivation			
	A)	Rice-rice-rice	B)	Rice-Maize-Maize
	C)	Maize-Pulses-Rice	D)	All of them
29.	Compact the field by passing 400 kg stone roller incondition			
	A)	Sandy soil	B)	Clay soil
	C)	Fluffy paddy soils	D)	Silty soil
30.	On drying it forms a hard mass on the soil surface is due to.....			
	A)	Iron and Aluminium	B)	Ca and Mg
	C)	Na and K	D)	All of them
31.	On drying it forms a hard mass on the soil surface is called			
	A)	Soil crusting	B)	Sub soil hard pan
	C)	Sand dunes	D)	Shallow soils
32.	Ill effects of soil crusting are			
	A)	Prevent germination of seeds	B)	Inhibits root growth
	C)	Poor infiltration	D)	A, B and C
33.	Effect of soil crusting are			
	A)	Accelerates surface run off	B)	Create poor aeration in rhizosphere
	C)	Affect nodule formation	D)	All of them
34.	Sub soil hardening /hard pan occur in			
	A)	Red soil	B)	Black soil
	C)	Sandy soil	D)	A and B
35.	Sub soil hardening /hard pan is due to			
	A)	Clay	B)	Fe and Al
	C)	CaCO ₃	D)	A, B and C
36.	Bulk density of sub soil hardening is			
	A)	>1.8Mg m⁻³	B)	<1.8Mg m ⁻³
	C)	0.5-1Mg m ⁻³	D)	A and B
37.	Presence of parent rock immediately below the soil			

	A) Shallow soils	B) Slow permeable	
	C) Excessively permeable	D) A and B	
38.	Soil swells and hard clods soften and break into small aggregatescondition		
	A) Flooded soils	B) Dry condition	
	C) Acid condition	D) High pH condition	
39.	The rate of decay of organic matter tends to be in flooded soils.		
	A) Fast	B) Very fast	
	C) Slow	D) A and B	
40.condition nitrate form is changed into nitrogen gases (N ₂ , NO ₃)) and escapes into the air.		
	A) Flooded soils	B) Dry condition	
	C) Alkali condition	D) Calcareous soil condition	
41.	Peaty soils are developed by.....condition		
	A) Dry condition	B) Flooded soils	
	C) Calcareous soil condition	D) Alkali condition	
42.soil contain large amounts of undecomposed organic matter, high acidity and the presence of numerous toxic material		
	A) Peaty soil	B) Alkali soil	
	C) Calcareous soil	D) A and C	
43.	Iron toxicity occur insoil conditon		
	A) Flooded soils	B) Dry condition	
	C) Alkali condition	D) Calcareous soil condition	
44.	Acid soil pH range		
	A) >7.0	B) <7.0	
	C) 7.5-9.0	D) A and B	
45.	Acid soils are occur in		
	A) Low rainfall area	B) High rainfall area	
	C) Dry area	D) B and C	
46.	High rainfall to leach appreciable amounts of exchangeable basesfrom the surface soils		
	A) Ca ²⁺	B) Mg ²⁺	
	C) Na ⁺ and K ⁺	D) All of them	
47.	Acid parent materials		
	A) Granite	B) Gneiss	
	C) Illite	D) A and B	
48.	Acid forming fertilizers		
	A) Ammonium sulphate	B) Ammonium nitrate	
	C) Rock phosphate	D) A and B	
49.	Acidity develops due to hydrogen (H ⁺) and aluminium (Al ³⁺) ions in the soil solution		
	A) Active acidity	B) Exchange acidity	
	C) Total acidity	D) A and C	

50.	Acidity that develops due to adsorbed hydrogen (H^+) and Aluminium (Al^{3+}) ions on the soil colloids is called			
	A)	Active acidity	B)	Exchange acidity
	C)	Total acidity	D)	A and C
51.	Summation of active and exchange acidity is called			
	A)	Active acidity	B)	Exchange acidity
	C)	Total acidity	D)	A and C
52.	Physiological disease of rice due to iron toxicity in submerged soils is called			
	A)	Browning disease	B)	Kaira disease
	C)	Rice blast disease	D)	A and B
53.	Availability of phosphorus is reduced due to fixation of phosphorus			
	A)	Iron and aluminium	B)	Zinc and Manganese
	C)	Nitrogen and Potassium	D)	A and B
54.	Reclamation of acid soil by			
	A)	Quick lime	B)	Hydrated lime
	C)	Dolomite	D)	A,B and C
55.	Acid sulphate soils pH range			
	A)	<4.0	B)	>4.0
	C)	>7.0	D)	>9.0
56.	Acid sulphate soils contain			
	A)	Sulphuric acid	B)	Iron
	C)	Aluminium sulphate	D)	A,B and C
57.	Acid sulphate soils otherwise called as			
	A)	Cat-clay	B)	Acid soil
	C)	Alkali soil	D)	A and C
58.	Amount of liming material that must be added to raise the pH is called			
	A)	Gypsum requirement	B)	Lime requirement
	C)	Acid requirement	D)	A and B
59.	Oxides of lime otherwise called as			
	A)	Burned lime	B)	Quick lime
	C)	Slaked lime	D)	A and B
60.	It can be produced by adding water to burned lime and is called			
	A)	Burned lime	B)	Quick lime
	C)	Slaked lime	D)	A and B
61.	Neutralizing index			
	A)	NI= CCE X Fineness factor	B)	NI=AEC X Fineness factor
	C)	NI= ECC X Fineness factor	D)	None of them
62.	Process by which the saline soil is formed is called Salinization			
	A)	Alkalinization	B)	Salinization
	C)	Pedoturbation	D)	A and B
63.	Reclamation of salt affected soils by the removal of			

	A) Leaching	B) Lime application	
	C) Gypsum application	D) B and C	
64.	The fraction of irrigation water that must be leached through the root zone to control soil salinity at any specified level is called		
	A) Leaching requirement	B) Lime requirement	
	C) Gypsum requirement	D) B and C	
65.	Leaching requirement		
	A) $LR = EC_{iw}/EC_{dw}$	B) $LR = EC_{dw}/EC_{iw}$	
	C) $LR = EI_{iw}/EI_{dw}$	D) $LR = ER_{iw}/ER_{dw}$	
66.	Amount of gypsum necessary to add to reclaim the soil is called		
	A) Leaching requirement	B) Lime requirement	
	C) Gypsum requirement	D) B and C	
67.	Gypsum requirement		
	A) $GR = ESP \text{ (final)} - ESP \text{ (initial)} \times CEC/100$	B) $GR = ESP \text{ (initial)} - ESP \text{ (final)} \times CEC/100$	
	C) $GR = ESP \text{ (initial)} - ESP \text{ (final)} \times AEC/100$	D) None of them	
68.	Soils are said to be saline if they contain an excess of		
	A) Soluble salts content	B) Acid content	
	C) Alkali content	D) None of them	
69.	Soils are said to be sodic or alkaline if they contain an excess of		
	A) Calcium	B) Sodium	
	C) Magnesium	D) Fe	
70.	Saline soil pH		
	A) <8.5	B) >8.5	
	C) 8.5-9	D) 9-9.5	
71.	Sodic soil pH		
	A) >8.5	B) <8.5	
	C) 8.5-9	D) 9-9.5	
72.	Saline -sodic soil pH		
	A) <8.5	B) >8.5	
	C) 9-9.5	D) 8.5-9	
73.	Saline soil EC		
	A) >4	B) <4	
	C) <3.5	D) <3	
74.	Sodic soil EC		
	A) <4	B) >4	
	C) >5	D) >9.5	
75.	Saline -sodic soil EC		
	A) >4	B) <4.5	
	C) <7	D) <9	

76.	Saline soil SAR				
	A)	>4.5	B)	<13	
	C)	>9.5	D)	>12	
77.	Sodic soil SAR				
	A)	<4.5	B)	>13	
	C)	<9.5	D)	<4	
78.	Saline -sodic soil SAR				
	A)	<4.5	B)	>13	
	C)	<9.5	D)	<4	
79.	Saline soil ESP				
	A)	>18	B)	>19	
	C)	<15	D)	>20	
80.	Sodic soil ESP				
	A)	<5	B)	<4.5	
	C)	<9.5	D)	>15	
PART-B					
(Answer All questions)					[10 x 2 = 20]
Match The following					
81.					
	1	Aggregation	a	Slaking	
	2	Salt concentration	b	Ravines	
	3	Breakdown of soil aggregates	c	Iron and Aluminium	
	4	> 9m deep and wide gullies	d	Soil water decreases	
	A)	c,d,a,b	B)	a,b,c,d	
	C)	d,c,a,b	D)	c,d,b,a	
82.					
	1	Submerged soils	a	Cultivable waste lands	
	2	Gullied and ravenous land	b	Uncultivable waste lands	
	3	Snow covered area	c	Marshy lands	
	4	Less infiltration rate	d	Slow permeable	
	A)	a,b,c,d	B)	c,a,b,d	
	C)	c,d,a,b	D)	b,c,a,d	
83.					
	1	Slow permeable	a	Fluppy paddy soil	
	2	Sinking of drought animals	b	Surface crusting	
	3	Iron and aluminium	c	Red soil	
	4	Sub soil hardening	d	High clay content	
	A)	a,c,b,d	B)	c,d,b,a	
	C)	d,a,b,c	D)	a,b,c,d	
84.					
	1	Fluppy paddy soil	a	Soil crusting	
	2	Surface hard mass	b	Rice-Rice-Rice	
	3	Sub soil hardening	c	Shallow soil	
	4	Parent rock depth 15-20cm	d	Fe and Al	
	A)	b,a,d,c	B)	a,b,c,d	
	C)	c,b,c,d	D)	d,c,b,a	
85.					
	1	Sub soil hardening	a	Flooded soil	

	2	Slow decomposition	b	Bulk density $>1.8\text{Mg m}^{-3}$	
	3	High acidity	c	Acid soil	
	4	$<7.0\text{pH}$	d	Peaty soil	
	A)	a,b,c,d	B)	b,a,d,c	
	C)	c,d,b,a	D)	d,b,c,a	
86.					
	1	Iron toxicity	a	Acid parent material	
	2	High rainfall area	b	Flooded soil	
	3	Granite	c	Acid fertilizer	
	4	Ammonium sulphate	d	Acid soil	
	A)	c,d,b,a	B)	d,a,b,c	
	C)	b,d,a,c	D)	a,b,c,d	
87.					
	1	N_2 and NO_3	a	Iron toxicity	
	2	Rice browning disease	b	Flooded soil	
	3	Acid sulphate soil	c	Quick lime	
	4	Oxides of lime	d	$<4\text{pH}$	
	A)	b,a,d,c	B)	a,b,c,d	
	C)	d,b,c,a	D)	c,d,b,a	
88.					
	1	Cat-clay	a	Saline soil	
	2	Neutralizing index	b	Acid sulphate soil	
	3	Leaching	c	$\text{EC}_{\text{iw}}/\text{EC}_{\text{dw}}$	
	4	Leaching requirement	d	$\text{CCE} \times \text{Fineness factor}$	
	A)	a,b,c,d	B)	b,d,a,c	
	C)	c,d,b,a	D)	d,c,a,b	
89.					
	1	Gypsum requirement	a	Sodic soil	
	2	Sodium	b	$\text{ESP (initial)} - \text{ESP (final)} \times \text{CEC}/100$	
	3	Saline	c	$>8.5\text{pH}$	
	4	Sodic	d	$<8.5\text{pH}$	
	A)	a,b,c,d	B)	d,b,c,a	
	C)	b,a,d,c	D)	a,d,c,b	
90.					
	1	Saline sodic	a	$>4\text{EC}$	
	2	Saline	b	$>8.5\text{pH}$	
	3	Sodic soil SAC	c	<15	
	4	Saline soil ESP	d	<13	
	A)	d,c,b,a	B)	a,b,c,d	
	C)	b,a,d,c	D)	c,d,b,a	