MIZORAM PUBLIC SERVICE COMMISSION

TECHNICAL COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF
ASSISTANT SOIL CONSERVATION ENGINEER (ASCE)
UNDER LAND RESOURCES, SOIL & WATER CONSERVATION DEPARTMENT
GOVERNMENT OF MIZORAM. FEBRUARY, 2021

AGRICULTURAL ENGINEERING PAPER - III

Time Allowed : 2 hours | Full Marks : 200

All questions carry equal marks of 2 each.
Attempt all questions.

1. A power tiller is most suited for rotary cultivation because:
(a) Its generate negative draft
(b) Its traction requirement is low
(c) It provides high degree of soil pulverization
(d) All of the above

2. The most common fertilizer metering device used in seed cum fertilizer drill is:
(a) Revolving bottom plate
(b) Star wheel
(c) Vertical rotor with groove
(d) Both (a) & (b)

3. The mouldboard of a mouldboard plough is usually made of:
(a) Malleable iron
(b) Mild steel
(c) Forged steel
(d) Soft-centre steel

4. Seed metering devices of seed drills include:
(a) Internal double run
(b) Fluted wheel
(c) Horizontal plate with cells
(d) Inclined plate with cells

5. Heavy draft of a disc plough is due to:
(a) Blunt disc
(b) Furrows too wide
(c) Loose bearings
(d) None of these

6. A coulter attachment is used with:
(a) Disc harrow
(b) Seed drill
(c) MB plough
(d) Subsoiler

7. The size of MB plough is expressed in terms of its:
(a) Width of cut
(b) Depth of cut
(c) Length of share
(d) None of these

8. The flutted wheel is driven by:
(a) square shaft
(b) base gear
(c) square gear
(d) circular shaft

9. Which of the following fixed type furrow openers is commonly used with fertilizer cum seed drills?
(a) Chisel point type
(b) Single disc type
(c) Double disc type
(d) Both (b) & (c)

10. The spike harrows are used mainly for:
(a) Primary tillage
(b) Inter cultivation
(c) Surface finish
(d) None of these

11. Which of the following is not the method of planting sugarcane?
(a) Flat planting (b) Furrow planting
(c) Trench planting (d) Staggered planting

12. Animal drawn Tyne and blade harrow are suitable for:
(a) Potato crop (b) Ground nut crop
(c) Carrot crop (d) Both (a) & (b)

13. Tilt angle in a disc plough varies from:
(a) $5\text{-}10^0$ (b) $10\text{-}15^0$
(c) $15\text{-}25^0$ (d) $30\text{-}40^0$

14. Threshing output in pedal operated thresher ranges between:
(a) 30 – 45 kg/hr (b) 40 – 45 kg/hr
(c) 30 – 50 kg/hr (d) 40 – 55 kg/hr

15. According to B.I.S. the permissible total grain loss from a mechanical thresher should not be more than:
(a) 3 % (b) 5 %
(c) 2 % (d) 3 – 5 %

16. According to B.I.S. the permissible total broken grain from a mechanical thresher should be less than:
(a) 2 % (b) 3 %
(c) 5 % (d) Both (a) & (b)

17. Equipment for placing seedlings in the soil is called:
(a) Seed drill (b) Seed cum fertilizer drill
(c) Planter (d) Transplanter

18. The commonly used power transmission system in fertilizer cum seed drills are:
(a) Chain sprocket & gears (b) Gears & belt pulleys
(c) Belt pulleys & cams (d) Belt pulley & chain sprocket.

19. Two primary tillage equipments from the listed below are:
(a) MB plough & Disc harrow (b) Disc plough & disc harrow
(c) Disc harrow & cultivator (d) MB plough & subsoiler

20. As per ASAE standards, the operating speed of MB plough is:
(a) 10-15 km/hr (b) 5.6-8.9 km/hr
(c) 6.6-8.6 km/hr (d) 20-30 km/hr

21. Draft of MB plough varies as:
(a) $2.2\text{-}5.4\ kg/cm^2$ (b) $5\text{-}10\ kg/cm^2$
(c) $10\text{-}15\ kg/cm^2$ (d) $2.5\text{-}4.5\ kg/cm^2$

22. 1 ha of land ploughing using walking type plough needs to walk a total distance of:
(a) 64 km (b) 32 km
(c) 100 km (d) 42 km

23. Dibbling of seed is generally done for sowing:
(a) Vegetable crops (b) Wheat
(c) Paddy (d) None

24. In compression sprayer, the tank is filled with liquid by its:
(a) $3/4^{th}$ volume (b) Half the capacity
(c) $2/3^{th}$ volume (d) Up to top level

25. The pressure of air pump in hand operated compressor sprayer ranges as:
(a) 1.75-5 kg/cm^2 (b) 5-10 kg/cm^2
(c) 5-7.5 kg/cm^2 (d) None

26. The Olpad thresher consists of 20 circular disc
(a) each of 50 cm diameter and 3 mm thickness.
(b) Each of 45 cm diameter and 3 mm thickness.
(c) Each of 50 cm diameter and 4 mm thickness.
(d) Each of 45 cm diameter and 4 mm thickness.

27. Olpad thresher are now generally not in use due to:
(a) high threshing cost (b) availability of power thresher
(c) its prolong time in completing threshing (d) all of these

28. For most of the cereal crops, the seedling rate varies from:
(a) 2-120kg/ha (b) 50-75kg/ha
(c) 40-60kg/ha (d) None of these

29. In general, placing of fertilizer by seed cum fertilizer drill is done at the depth of:
(a) 8-12cm (b) 5-7cm
(c) 10-20cm (d) None of these

30. High speed engines operates at the following speeds:
(a) Less than 1000rpm (b) At 500 rpm
(c) Higher than 1000rpm (d) None of these

31. In seed drills the furrow openers are usually set at the spacing of:
(a) 15 to 20 cm (b) 20 to 30 cm
(c) 10 to 15 cm (d) None of these

32. The operating speed of power sprayer, varies from:
(a) 4.8 to 8 km/hr (b) 10 to 20 km/hr
(c) 20 to 35 km/hr (d) None of these

33. Weeding of paddy crops in standing water is successfully performed with help of:
(a) Wheel hoe (b) Grubber
(c) Kudali (d) Rotary paddy weeder

34. The engine used for operating self propelled type Combine Equiptment generally ranges with hp
(a) 60 – 150 hp (b) 35 – 40 hp
(c) 25 – 35 hp (d) 60 – 200 hp

35. In Combine, the cutter head can be adjusted upto:
(a) 25^0 angles (b) 55^0 angles
(c) 75^0 angles (d) None of these

36. Which of the following tool is use for collecting uprooted weeds:
(a) Hand Cultivators (b) Khurpa
(c) Garden Rake (d) Garden Trowel

37. The reel diameter of a combine ranges as:
(a) 101.6 to 152.4 cm (b) 75 to 80 cm
(c) 80 to 120 cm (d) 101.9 to 156.4 cm

38. Dusting capacity of air-plane duster varies from:
(a) 220 to 990 kg (b) 100 to 200 kg
(c) 200 to 500 kg (d) None of these

39. Loop type cylinder are generally used in:
(a) Paddy thresher (b) Wheat thresher
(c) Maize thresher (d) None of these

40. A thresher not equipped with aspirator is called:
(a) Drummy thresher (b) Wheat thresher
(c) Paddy thresher (d) None of these

41. The type of moisture that can be removed by common drying techniques is:
(a) Equilibrium moisture (b) Total moisture
(c) Free moisture (d) Bound moisture

42. Machine used for dehusking of pulses is:
(a) Rubber roll dehusker (b) Emery roll dehusker
(c) Centrifugal dehusker (d) Under – runner disc Sheller

43. The property of material by which it can be drawn to smaller section, due to tension, is called:
(a) Plasticity (b) Elasticity
(c) Ductility (d) Malleability

44. As the elastic limits reaches, tensile strain:
(a) increases more rapidly (b) decrease more rapidly
(c) increases in proportion to the stress (d) decreases in proportion to the stress

45. The stress necessary to initiate yielding, is considerably:
(a) more than that necessary to continue it (b) less than that necessary to stop it
(c) more than that necessary to stop it (d) Less than that necessary to continue it

46. Every material obeys the Hooke's law within its:
(a) elastic limit (b) plastic point
(c) limit of proportionality (d) none of these

47. The law which states, "within elastic limits strain produced is proportional to the stress producing it", is known as:
(a) Bernoulli's law (b) Stress law
(c) Hooke's law (d) Poisson's law

48. Along the principal plan subjected to maximum principal stress
(a) maximum shear stress acts (b) minimum shear stress acts
(c) no shear stress acts (d) none of these

49. The ratio of the tensile stress developed in the wall of a boiler in the circumferential direction to the tensile stress in the axial direction, is:
(a) 4 (b) 7
(c) 2 (d) 1

50. At either end of a plane frame, maximum number of possible transverse shear forces, are:
(a) 1 (b) 3
(c) 2 (d) 4

51. At either end of a plane frame, maximum number of possible bending moments, are:
(a) 1 (b) 3
(c) 2 (d) 0

52. A simply supported beam of span L carries a uniformly distributed load W. The maximum bending moment M is:

(a) $WL/2$ (b) $WL/4$

(c) $WL/8$ (d) $WL/16$

53. A simply supported beam of span L carries a concentrated load W at its mid-span. The maximum bending moment M is:

(a) $WL/2$ (b) $WL/4$

(c) $WL/8$ (d) $WL/16$

54. The shape of the bending moment diagram over the length of a beam, carrying a uniformly distributed load is always:

(a) Parabolic (b) linear

(c) cubical (d) circular

55. The maximum bending moment due to the moving load on a simply supported beam, occurs:

(a) at mid span (b) at supports

(c) under the load (d) none of these

56. For a cantilever with a uniformly distributed load W over its entire length L, the maximum bending moment is:

(a) $\frac{1}{2}WL$ (b) $\frac{1}{2}W^2L$

(c) $\frac{1}{3}WL$ (d) WL

57. Along the neutral axis of a simply supported beam:

(a) fibers do not undergo strain (b) fibers undergo minimum strain

(c) fibers undergo maximum strain (d) none of these

58. A reinforce concrete beam is assumed to be made of:

(a) homogeneous material (b) heterogeneous material

(c) isotropic material (d) none of these

59. The maximum deflection of a simply supported beam of length L with a central load W, is:

(a) $\frac{WL^2}{48EI}$ (b) $\frac{W^2L}{24EI}$

(c) $\frac{WL^3}{48EI}$ (d) $\frac{WL^2}{8EI}$

60. In a continuous bending moment curve the point where it changes sign, is called:

(a) point of inflexion (b) point of contraflexture

(c) point of virtual hinge (d) all the above

61. A member which does not regain its original shape after load producing deformation is removed and it is called:

(a) Elasticity (b) Rigid

(c) Plasticity (d) None of these

62. For a stable frame structure, number of members required, is:

(a) three times the number of joints minus three (b) twice the number of joints minus three

(c) twice the number of joints minus two (d) twice the number of joints minus one

63. The moment diagram for cantilever beam whose free end is subjected to a bending moment, will be:
(a) Parabola (b) Triangle
(c) Rectangle (d) cubic parabola

64. In a loaded beam, the point of contraflexture occurs at a section where:
(a) B.M is minimum (b) S.F is minimum
(c) B.M and S.F changes sign (d) S.F is maximum

65. A beam is said to be in uniform strength, if:
(a) B.M is same throughout the beam (b) bending stress is same throughout the beam
(c) deflection is same throughout the beam (d) shear stress is same throughout the beam

66. The advantages of reinforced concrete is due to:
(a) monolithic character (b) fire resisting and ductility
(c) moulding in any desirable shape (d) all of these

67. In a singly reinforced beam, the effective depth is measured from its compression edge to:
(a) tensile reinforcement (b) tensile edge
(c) neutral axis of the beam (d) longitudinal central axis

68. In a singly reinforce beam, if the permissible stress in concrete reaches earlier than that of steel, the beam section is called:
(a) under-reinforced section (b) over reinforced section
(c) economic section (d) critical section

69. As the cube size increases, the strength of concrete:
(a) decreases (b) remains constant
(c) increases (d) insufficient data

70. Tensile strength of concrete is measured by:
(a) applying third point load on a prism
(b) applying the tensile load along the diameter of cylinder
(c) applying the compression load along the diameter of cylinder
(d) direct tension test in Universal Testing machine (UTM)

71. Good brick should contain about:
(a) 20 – 30 % Alumina (b) 25- 35 % Alumina
(c) 50 – 60 % Alumina (d) 55 – 65 % Alumina

72. Modulus of rupture of concrete gives:
(a) the direct tensile strength of concrete (b) the direct compressive strength of concrete
(c) the tensile strength of concrete in bending (d) the characteristic strength of concrete

73. The permissible bending tensile stress in concrete for the vertical wall of an RC water tank made of M25 concrete is:
(a) 8.5 N/mm^2 (b) 6.0 N/mm^2
(c) 4.5 N/mm^2 (d) 1.8 N/mm^2

74. The workability of concrete can be improved:
(a) increasing the size of aggregate (b) decreasing the size of aggregate
(c) increasing the fine aggregate (d) decreasing the fine aggregate

75. Strength of concrete is directly proportional to:
(a) cement water ratio (b) water cement ratio
(c) sand cement ratio (d) water aggregate ratio

76. Setting time of cement can be increases by adding:
(a) Gypsum (b) Calcium chloride
(c) Calcium sulphate (d) None of these

77. Good quality building stones should not contain soluble salts more than:
(a) 15% (b) 20%
(c) 25% (d) 30%

78. The building stone can be dressed very easily:
(a) after seasoning (b) just after quarrying
(c) after some months of quarrying (d) any time

79. Percentage of silica in good brick earth lies between:
(a) 20% – 40% (b) 10% - 20%
(c) 50% - 60% (d) 40% - 55%

80. The standard size of a brick is:
(a) 20 × 10 × 10 cm (b) 19 × 9 × 9 cm
(c) 18 × 9 × 9 cm (d) 18 × 8 × 8 cm

81. The red colour of brick is due to:
(a) Magnesia (b) Alumina
(c) Silica (d) Iron oxide

82. The process of mixing clay, water and other ingredients to make brick is called:
(a) Moulding (b) Tempering
(c) Pugging (d) blending

83. Lime is mixed with brick earth:
(a) to impart plasticity (b) to increase durability
(c) to prevent shrinkage (d) to increase impermeability

84. Percentage shrinkage allowance provided on moulds for brick manufacture is:
(a) 2-6% (b) 8-12%
(c) 32-24% (d) 8-14 %

85. Maximum percentage of water absorption of 1st class brick in 24 hrs. should be limited:
(a) 20% (b) 10%
(c) 30% (d) 25%

86. For one cubic metre of brick masonry, the number of bricks required is:
(a) 400 (b) 500
(c) 5000 (d) 4500

87. Lime stone is not a:
(a) sedimentary rock (b) stratified rock
(c) aqueous rock (d) metamorphic rock

88. The lime suitable for making mortar is:
(a) quick lime (b) fat lime
(c) hydraulic lime (d) pure lime

89. Seasoning of timber can be done in kilns within:
(a) 1– 5 days (b) 15 – 20 days
(c) 5 – 10 days (d) about 30 days

90. The moisture content in well-seasoned timber is:
(a) 0 to 10%
(b) 15 to 20 %
(c) 10 to 12 %
(d) 20 to 25%

91. A piece of timber whose thickness and width are respectively 5 cm and 10 cm is called:
(a) Slate
(b) Plank
(c) Board
(d) Strip

92. Plywood is specified by:
(a) numbers of layers
(b) volume
(c) weight
(d) thickness

93. Defect caused by shrinkage in timber is:
(a) Twist
(b) Crook
(c) Cup and blow
(d) All of these

94. Timber can be made more fire resistant by:
(a) Dipping and stepping process
(b) Sir Abel's process
(c) Charring
(d) Hot and cold open tank treatment

95. Seasoning of timber is necessary to:
(a) increase the fire resistant
(b) reduced the microbial substance
(c) increase the vermin resistant
(d) expel the moisture present in the timber

96. Finer the cement, more is the:
(a) early strength
(b) workability
(c) shrinkage cracking
(d) all of these

97. Which of following in timber is caused by fungus:
(a) Upsets
(b) Foxiness
(c) dry rot
(d) wet rot

98. The setting and hardening of cement after the addition of water occurs due to:
(a) binding action of water
(b) evaporation of water
(c) hydration and hydrolysis of same constituent compounds of cement which act as glue
(d) none of the above

99. The initial setting of cement is caused by formation of:
(a) tricalcium aluminate
(b) tricalcium silicate
(c) tetracalcium aluminate
(d) diacalcium silicate

100. For rapid hardening cement:
(a) gypsum is not added
(b) is subjected to large shrinkage cracks
(c) has 1 day strength same as that of 3 days strength of OPC
(d) all of these

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