MIZORAM PUBLIC SERVICE COMMISSION

General Competitive Examinations for Recruitment to the post of Junior Engineer under Irrigation & Water Resources Department October, 2018

CIVIL ENGINEERING PAPER-I

Time Allowed : 2 hours Full Marks : 150

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

1. A good building stone should not absorb water more than
(a) 5% (b) 10%
(c) 15% (d) 20%

2. Which of the following timbers is suitable for making sports goods
(a) Mulberry (b) Mahogany
(c) Sal (d) Deodar

3. The age of a tree can be known by examining
(a) Cambium layer (b) Annular rings
(c) Medullary rays (d) Heart wood

4. The nominal size of the modular brick is
(a) 19cmx9cmx8cm (b) 19cmx19cmx9cm
(c) 20cmx10cmx10cm (d) 20cmx20cmx10cm

5. The amount of water used for 1 kg of distemper is
(a) 0.20 litre (b) 0.40 litre
(c) 0.60 litre (d) 0.80 litre

6. The main ingredients of Portland cement are
(a) Lime and silica (b) Lime and alumina
(c) Silica and alumina (d) Lime and iron

7. The initial setting time for ordinary Portland cement as per IS specification should not be less than
(a) 10 min (b) 30 min
(c) 60 min (d) 600 min

8. As per IS Specification, the maximum final setting time for ordinary Portland cement should be
(a) 30 min (b) 1 hr
(c) 6 hr (d) 10 hr

9. After storage, the strength of cement
(a) Decreases (b) Increases
(c) Remain same (d) May increase or decrease

10. Which of the following cement is suitable for use in massive concrete structure such as large dam
(a) Ordinary Portland cement (b) Low heat cement
(c) Rapid hardening cement (d) Sulphate resisting cement

11. In brick masonry, the bond produced by laying alternate header and stretcher in each course is known as

(a) English bond (b) Double Flemish bond
(c) Zigzag bond (d) Single Flemish bond

12. Paints with white lead base are suitable for painting of

(a) Wood work (b) Iron work
(c) Both wood and iron work (d) None of these

13. The vehicle used in case of enamel paints is usually

(a) Linseed oil (b) Water
(c) Varnish (d) None of these

14. The function of solvent in an oil paint is

(a) It reduces shrinkage crack
(b) It provides binder for the ingredients
(c) It improve the durability of paints
(d) It makes the paint thin so as to apply on the surface

15. Le Chatelier's device is used for determining

(a) Setting time of cement (b) Soundness of cement
(c) Tensile strength of cement (d) Compressive strength of cement

16. The bearing capacity of a water logged soil can be improved by

(a) Compacting the soil (b) Draining the soil
(c) Increasing the depth of foundation (d) Grouting

17. If the degree of saturation of a partially saturated soil is 60%, then air content of the soil is

(a) 40% (b) 60%
(c) 80% (d) 100%

18. If the plasticity index of a soil mass is zero, the soil is

(a) Sand (b) Silt
(c) Clay (d) Clayey silt

19. Shear strength of a soil is a unique function of

(a) Effective stress only (b) Total stress only
(c) Both effective and total stress (d) None of these

20. Total lateral earth pressure is proportional to

(a) Depth of soil (b) Square of the depth of soil
(c) Angle of internal friction of soil (d) None of these

21. A plate load test is used to estimate

(a) Bearing capacity of foundation (b) Settlement of foundation
(c) Both (a) & (b) (d) None of these

22. In a Tri-axial compression test on a soil specimen, the intermediate principal stress is equal to

(a) Major principal stress
(b) Minor principal stress
(c) Difference between major and minor principal stress
(d) None of these

23. Coarse grained soils are best compacted by a
(a) Drum roller
(b) Rubber tyre roller
(c) Sheep's foot roller
(d) Vibratory roller

24. Coefficient of permeability of soil
(a) Does not depend upon temperature
(b) Increase with the increase in temperature
(c) Increase with the decrease in temperature
(d) None of these

25. The water content of soil which represent the boundary between plastic state and liquid state is known as
(a) Liquid limit
(b) Plastic limit
(c) Shrinkage limit
(d) Plasticity index

26. If the void of a soil mass are full of air only, the soil is termed as
(a) Air entrance soil
(b) Partially saturated soil
(c) Dry soil
(d) Dehydrated soil

27. Rate of consolidation
(a) Increase with decrease in temperature
(b) Increase with increase in temperature
(c) Is independent of temperature
(d) Is unaffected by permeability of soil

28. A shallow foundation is defined as a foundation which
(a) Has low bearing capacity
(b) Has a depth of embedment less than its width
(c) Is resting on the ground surface
(d) Causes less settlement

29. Select the incorrect statement
(a) Bearing capacity of a soil depends upon the amount and direction of load
(b) Bearing capacity of a soil depends on the type of soil
(c) Bearing capacity of a soil depends upon shape and size of footing
(d) Bearing capacity of a soil is independent of rate of loading

30. A combine footing is generally used when
(a) Number of column is more than two and they are spaced far apart
(b) Number of column is two and they are spaced close to each other
(c) Number of column is two and they are spaced far a part
(d) There is only one column

31. The hydrological cycle may be expressed by the following simplified equation
(a) Precipitation = Evaporation - Runoff
(b) Precipitation = Evaporation + Runoff
(c) Evaporation = Precipitation + Runoff
(d) Runoff = Evaporation + Precipitation

32. Cyclonic precipitation is caused by
(a) Pressure difference
(b) Temperature difference
(c) Natural topographical barriers
(d) All of these

33. Which of the following is a non-recording rain gauge
(a) Tipping bucket type rain gauge
(b) Simon's rain gauge
(c) Steven's weighting type rain gauge
(d) Floating type rain gauge

34. The runoff increase with
(a) Increase in intensity of rain
(b) Increase in infiltration capacity
(c) Increase in permeability of soil
(d) All of these

35. Aquifers are
(a) Impermeable formation which contain water
(b) Permeable formation having structure which permit appreciable quantity of water
(c) Impermeable formation which neither contain water nor transmit any water
(d) None of these

36. Specific capacity of a well is
(a) Constant
(b) Increase as discharge increase
(c) Decrease as discharge increase
(d) None of these

37. If there is no recharge to or outflow from the ground water in basin, the water table would eventually
(a) Decrease
(b) Increase
(c) Horizontal
(d) None of these

38. The following is not a form of precipitation
(a) Drizzle
(b) Rain
(c) Snow
(d) Moisture

39. A bore well give more discharge than an open well
(a) Due to increase velocity
(b) Due to more cross-sectional area
(c) Both (a) & (b)
(d) None of these

40. Indigenous method of lifting water include
(a) Hydraulic ram
(b) Windmill
(c) Pumps
(d) Basket

41. Ground water is usually free from
(a) Suspended impurities
(b) Dissolved impurities
(c) Both (a) & (b)
(d) None of these

42. Rainwater harvesting means
(a) Collection of water from river
(b) Collection of water from surface on which rain fall
(c) Collection of water from sea
(d) Collection of water from spring source

43. Advantage of Rainwater harvesting
(a) Free from bacteria
(b) Free from hazardous chemical
(c) Easy to collect
(d) None of these

44. The earth's water circulatory system is known as
(a) Topographical cycle
(b) Meteorological cycle
(c) Geological cycle
(d) Hydrological cycle

45. Stream channel which are below the ground water table are called
(a) Effluent stream
(b) Influent stream
(c) Surface runoff
(d) Base flow

46. As per IS : 456-2000, minimum grade of concrete in reinforced concrete work shall be not less than
(a) M10
(b) M15
(c) M20
(d) M25

47. The conventional working stress design method is based on the behaviour of structure at

(a) Ultimate load (b) Working load

(c) Failure load (d) Serviceability limit load

48. The nominal mix (cement : sand : aggregate) for M20 concrete is

(a) 1 : 4 : 8 (b) 1 : 3 : 6

(c) 1 : 2 : 4 (d) 1 : 1.5 : 3

49. As per IS : 456-2000, the mixing time for concrete in a mechanical mixer shall be at least

(a) 1 min (b) 2 min

(c) 3 min (d) 4 min

50. The term 'Characteristic load' means that value of load which has a probability of not being exceeded during the life of the structure as below

(a) 85% (b) 90%

(c) 95% (d) 100%

51. For design purpose, the compressive strength of concrete in structure shall be assumed to be

(a) 0.65 times the characteristic strength (b) 0.67 times the characteristic strength

(c) 0.70 times the characteristic strength (d) 0.77 times the characteristic strength

52. For column, the bar shall not be less than

(a) 10 mm dia (b) 12 mm dia

(c) 16 mm dia (d) 20 mm dia

53. The longitudinal reinforcement in column shall not be more than

(a) 4% of the gross sectional area of column (b) 5% of the gross sectional area of column

(c) 6% of the gross sectional area of column (d) 7% of the gross sectional area of column

54. Minimum cover for footing shall be

(a) 35 mm (b) 40 mm

(c) 50 mm (d) 60 mm

55. Lap splices shall not be used for bar larger than

(a) 20 mm (b) 25 mm

(c) 32 mm (d) 36 mm

56. The water used for concrete shall have PH value not less than

(a) 5 (b) 6

(c) 7 (d) 8

57. The maximum permissible free fall of concrete may be taken as

(a) 1.5 m (b) 2 .0m

(c) 2.5 m (d) 3.0 m

58. The following statement is not correct

(a) Cracks in RCC water tank caused due to expansion and contraction due to shrinkage can be avoided by proper use of movement joints

(b) Cracks in RCC water tank caused by differential expansion due to heat of hydration are not likely to occur in member less than 450 mm thick

(c) Crack in RCC water tank caused by settlement can be minimized or avoided by careful site selection and good foundation design

(d) The safety factor against cracking is more than the safety factor required for structural safety

59. The following statement is not correct
(a) For larger structure, rigid joints are preferred
(b) Rectangular tanks are useful for small capacities
(c) Circular tanks are preferred for large capacities
(d) Water tightness is one of the most important factor in water tank design

60. Side face reinforcement is provided in the web of the beam when the depth of the beam exceeds
(a) 600 mm (b) 700 mm
(c) 750 mm (d) 800 mm

61. The stability of gravity retaining wall is maintained by
(a) Weight of the earth on the base of retaining wall
(b) Weight of the Retaining wall
(c) Weight of the Retaining wall and weight of the earth on the base of the Retaining wall
(d) None of these

62. Counter-fort Retaining wall is generally used for height of
(a) Upto 3 m (b) 3m to 6m
(c) 6m to 8m (d) 8m to 10 m

63. Generally, Breast wall are provided to protect slope
(a) At valley side (b) At foot of the earth slope
(c) At uphill slope (d) None of these

64. Gabion wall are generally provided to protect slope at the location
(a) At Firm ground (b) At Loose ground
(c) At down hill side (d) None of these

65. When there is no heavy earth pressure and to merely protect the slope in position
(a) R/wall is provided (b) B/wall is provided
(c) Revetment wall is provided (d) Toe wall is provided

66. Weep holes as a small opening left through retaining structure is
(a) To retain passive earth pressure (b) To retain active earth pressure
(c) To drain away percolated water (d) To provide necessary movement

67. In the principle of design, for safety against overturning, the resultant of the horizontal and vertical forces must pass through
(a) Middle third of the base of the wall (b) Half of the base of the wall
(c) One fourth of the base of the wall (d) Beyond the base of the wall

68. When the rock mass moves about a point above its centre of gravity, it is called
(a) Falls (b) Topples
(c) Rotational slides (d) Translational slides

69. The following is not the causes of slope movement
(a) Changes in the water content (b) Lateral spreads
(c) Surcharge (d) Changes due to weathering

70. Field investigation is divided into
(a) Two stages (b) Three stages
(c) Four stages (d) Five stages

71. Slip circle / Plane of rupture is associated with

(a) Stability analysis
(b) Landslide investigation
(c) Cause of slope movement
(d) None of these

72. For design of Retaining wall, the following force acting on the Retaining wall is not required to be considered

(a) Horizontal
(b) Vertical
(c) Resultant
(d) Pressure on foundation

73. The factor of safety against sliding is taken as

(a) 1
(b) 2
(c) 3
(d) 4

74. If the top of the earth is horizontal (ä=0), the coefficient of active earth pressure is

(a) 1+SinØ/1-SinØ
(b) 1-SinØ/1+SinØ
(c) 1+CosØ/1-CosØ
(d) 1-CosØ/1+CosØ

75. The following is not a slope protective structure

(a) Gabion wall
(b) Breast wall
(c) Toe wall
(d) Culvert

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