UKPSC AE

Civil Engineering

Mega Mock Challenge
(January 12th - January 13th 2022)

Questions & Solutions

1. Most total station instruments measure angles by means of _____ of extremely precise digital bar-codes etched on rotating glass cylinders or discs within the instrument.

   A. Refraction   B. Electro-optical scanning

   C. Radiation   D. Digitization

Ans. B

2. The number of GPS Satellites required for GPS receiver to correctly draw 3 D map to locate the geo graphical position of the object over the earth surface is

   A. 1   B. 2

   C. 3   D. 4

Ans. D

3. In geodetic survey, all plumb lines are

   A. Radial   B. Continuous

   C. Parallel   D. Perpendicular

Ans. A

4. Well conditioned cable triangle is related with

   A. 50° 40′   B. 56° 14′

   C. 60° 20′   D. 66° 15′

Ans. B

5. The BS is 6.655m taken on BM of RL 400.000. If FS is 1.45m, RL of the last station is:

   A. 394.795   B. 401.450

   C. 405.205   D. 406.655

Ans. C

6. The fore and back bearing of a line differ exactly by:

   A. 360°   B. 180°

   C. 90°   D. 45°

Ans. B

7. Subsidiary station established as near the true triangulation station as possible is known as:

   A. Satellite station   B. Principal station

   C. Central station   D. Pivot station

Ans. A

8. Magnitude of shear stress induced in a shaft due to applied torque varies from:

   A. Maximum at centre to zero at circumference

   B. Maximum at centre to minimum (Not Zero) at the circumference

   C. Zero at centre to maximum at circumference

   D. Minimum (Not Zero) at centre to maximum at circumference

Ans. C

9. When a shaft is subjected to torsion, the relation between maximum shear stress (τ), modulus of rigidity I and angle of twist (θ) is given by

Where, L-length shaft, R-radius of shaft

A. $\dfrac{C\theta}{\tau} = \dfrac{R}{L}$

B. $\dfrac{C\theta}{L} = \dfrac{\tau}{R}$

C. $\dfrac{C\theta}{R} = \dfrac{\tau}{L}$

D. $\dfrac{C}{L\theta} = \dfrac{\tau}{R}$

Ans. B

10. In the conjugate beam method, the fixed support in actual beam is considered as _____ support in the conjugate beam.

A. Free

B. Hinge

C. Fixed

D. Roller

Ans. A

11. Which of the following is an incorrect assumption in the analysis of truss?

A. All joints are pinned

B. Loads applied at joints only

C. All members are straight

D. Weights of members are acting at their centres

Ans. D

12. If k_i is the stiffness of ith member at a joint, the distribution factor for the member is:

A. K_i

B. $\dfrac{k_i}{\sum k_i}$

C. $\sum k_i$

D. $(\sum k_i - k_i)$

Ans. B

13. Gauge of bolt is the distance between two consecutive bolts in

A. the direction perpendicular to the direction of load/stress

B. the direction of load/stress

C. the direction at 45 to the line of action of force

D. an inclined direction

Ans. A

14. Two angles ISA 60 × 60 × 5 are welded with gusset plate back to back. The size of the weld is 4.5 mm. The effective throat thickness is

A. 3.15 mm

B. 4.5 mm

C. 4.0 mm

D. 35 mm

Ans. A

15. A rigid frame detailed to provide good ductility and support for both lateral and gravity loads by flexural action is called:

A. Ordinary moment resisting frame

B. Intermediate moment resisting frame

C. Special moment resisting frame

D. All of the above

Ans. D

16. In singly reinforced sections, when the section is under-reinforced, the relation between depth of neutral asix (x_u) and the limiting vaue of depth of neutral axis ($x_{u'}$ max) is:

A. $x_u = x_{u'}$max

B. $x_u < x_{u'}$max

C. $x_u >= x_{u'}$max

D. None of the above

Ans. B

17. Relation between Young's modulus and cube strength of concrete is:

A. $E = 500 \sqrt{f_{ck}}$

B. $E = 5700 \sqrt{f_{ck}}$

C. $E = 5000 \sqrt{f_{ck}}$

D. $E = 700 \sqrt{f_{ck}}$

Ans. C

18. Pedestal columns are

A. Very short columns with effective length less than three times least lateral dimension

B. Very long columns with effective length more than four times least lateral dimensions

C. Very short Columns with effective length more than three times least lateral dimension,

D. Very short columns with effective length more than the least lateral dimensions.

Ans. A

19. Gypsum is added to Portland cement during its manufacturing so that it may

A. Accelerate the setting time

B. Retard the setting time

C. Decreases the burning temperature

D. Facilitate grinding

Ans. B

20. Honey comb brick wall is measured in

A. Metres

B. Square metres

C. Cube metres

D. Number

Ans. B

21. A queen closer is

A. Full brick

B. Longitudinally $\frac{1}{2}$ brick

C. $\frac{3}{4}$ brick

D. $\frac{1}{2}$ brick

Ans. B

22. Brick earth contains major quantity of

A. Silica

B. Aluminium

C. Calcium

D. Magnesium

Ans. A

23. In which type of bond is cavity existing?

A. Flemish bond

B. English bond

C. Rat-trap bond

D. Stretcher bond

Ans. C

24. In a tree the cambium layer is situated between

A. the outer bark and inner bark

B. the inner bark and sap wood

C. the sap wood and heart wood

D. the pith and heart wood

Ans. B

25. Physical life of an equipment is defined as

A. age at which the equipment is worn out and it can no longer reliably produce

B. the life over which the equipment can earn a profit

C. time period that maximizes the profit over the equipment life

D. age at which depreciation cost exceeds the purchase cost

Ans. A

26. What are the advantages of a good site layout or job layout?

A. Smooth and economical working of project

B. It reduces the completion time of project.

C. Provides more safety on site.

D. All the above

Ans. D

27. A soft saturated clayey soil tested unconfined gave an axial stress of $50 kN/m^2$ at failure . The shear strength of the soil is

A. $50 kN/m^2$ B. $100 kN/m^2$

C. $25 kN/m^2$ D. None of the above

Ans. C

28. Boussinesque's Solution for the stresses in soil caused by a point load at the surface is based on some assumptions. One of which is

A. Soil medium is finite medium   B. Soil medium is plastic

C. Soil medium obeys Hook's law   D. Soil medium is not homogenous

Ans. C

29. The method which is more suitable for the determination of permeability of sandy soil is

A. constant head method   B. variable head method

C. Horizontal permeability test   D. hydrometer method

Ans. A

30. The soil transported by wind is called:

A. Aeolian soil   B. Marine soil

C. Alluvial soil   D. Lacustrine soil

Ans. A

31. Water content of soil is 0.15, Degree of saturation 70%, void ratio is 0.61, then specific gravity is :

A. 2.85   B. 2.13

C. 2.50   D. 2.17

Ans. A

32. As per IS 10500, acceptable limit for chlorides in mg/l in drinking water is

A. 100 mg/l   B. 250 mg/l

C. 500 mg/l   D. 1500 mg/l

Ans. B

33. Blue baby disease may be caused in infants due to drinking water containing higher concentrations of

    A. Nitrites
    B. Nitrates
    C. Lead
    D. Arsenic

Ans. B

34. Due to incomplete combustion of fuels from petrol engines, the gas liberated is

    A. CO_2
    B. CO
    C. N_2
    D. He

Ans. B

35. The permissible pH value for public watersupplies may range between:

    A. 4.5 - 5.5
    B. 5.5 - 6.5
    C. 6.5-8.5
    D. 7.0- 8.5

Ans. C

36. The Goodrich method is used for

    A. Determining reservoir capacity
    B. Flood routing
    C. Reservoir sediment evaluation
    D. Trap efficiency

Ans. B

37. If S_y = Specific yield and S_r = Specific retention then

    A. $S_y + S_r = 0.50$
    B. $S_y + S_r = $ Porosity
    C. $S_y + S_r = 1.0$
    D. $S_y + S_r = $ Permeability

Ans. B

38. The geological formation which contains and readily yields water to tube wells:

    A. Water table
    B. Aquifer
    C. Aquiclude
    D. Aquifuge

Ans. B

39. The best method of estimating runoff is

    A. Unit Hydro graph
    B. Runoff-Coefficient Method
    C. Rational formula
    D. Infiltration index method

Ans. A

40. The hydrologic routing methods are based

    A. continuity equation only
    B. energy equation only
    C. momentum equation only
    D. continuity and momentum equations

Ans. A

41. Isohytes are the imaginary lines joining the points of equal;

    A. Pressure
    B. Height
    C. Humidity
    D. Rainfall

Ans. D

42. Example of subsurface source of water:

    A. River
    B. Ponds
    C. Spring
    D. Streams

Ans. C

43. Specific capacity of a confined well

    A. is constant at all drawdowns
    B. increases with increasing discharge
    C. decreases with increasing discharge
    D. is constant at all discharges

Ans. C

44. The standard height of a standard rain gauge

    A. 10cm
    B. 20cm
    C. 30cm
    D. 40cm

Ans. C

45. In case of gravity dams, the factor of safety against overturning should not be less than

    A. 1.00
    B. 1.10
    C. 1.25
    D. 1.50

Ans. D

46. The rate at which a soil is capable of absorbing water is called:

    A. Filtration
    B. Infiltration capacity
    C. Filtration capacity
    D. infiltration

Ans. B

47. The gross commanded area for a distributary is 6000 hectares, 80% of which is culturable irrigable. The intensity of irrigation for Kharif season is 25%. The area to be irrigated in Kharif season is _____ hectares.

    A. 600
    B. 1200
    C. 2400
    D. 4800

Ans. B

48. Which one of the following are Kharif crops?

    A. Barley, rice, gram
    B. Rice, maize, cotton, groundnut
    C. Rice, mustard linseed
    D. Barley, maize, gram

Ans. B

49. Auxiliary devices in stilling basins are provided

    A. to stabilize the flow
    B. To reduce the length of the basin
    C. As additional measure to control jump
    D. All of the above

Ans. D

50. The scour velocity of the stream is the

    A. Average velocity
    B. Maximum velocity at any time during the year
    C. Velocity which can move the particles of bed materials
    D. Velocity at which a highway bridge is liable to be damaged

Ans. C

51. Type of cross – drainage work when canal is passed below the drainage is:

    A. Super passage
    B. Aqueduct
    C. Inlet
    D. Level crossing

Ans. A

52. The dimensions of dynamic viscosity are

A. $\dfrac{L^2}{T}$

B. $\dfrac{M}{LT}$

C. $\dfrac{MT}{L}$

D. $\dfrac{T}{L^2}$

Ans. B

53. If the Froude number of a hydraulic jump is 5.50, it can be classified as

A. as oscillating jump

B. a weak jump

C. a strong jump

D. a steady jump

Ans. D

54. If in a flow field $\dfrac{p}{\gamma} + \dfrac{v^2}{2g} + z$ = constant between any two points, flow must be

A. Steady, compressible and irrotational

B. Unsteady, incompressibal and irrotational

C. Steady, incompressible and irrotational

D. Steady, compressible and along a stream line

Ans. C

55. A stable submerged body has:

A. Centre of gravity below centre of buoyancy

B. Centre of gravity below metacentre

C. Centre of gravity above centre of buoyancy

D. Centre of gravity above metacentre

Ans. A

56. A venturimeter is used for measuring

A. Piezometric head

B. Total energy

C. Flow rate

D. Pressure

Ans. C

57. The hydraulic mean depth for a circular pipe of diameter d is:

A. $\dfrac{d}{6}$

B. $\dfrac{d}{4}$

C. $\dfrac{d}{5}$

D. d

Ans. B

58. Two throw reciprocating pumps mean:

A. Double acting pump

B. Double reciprocating pump

C. Duplex double acting pump

D. Double cylindrical pump

Ans. D

59. The specific speed of the Francis turbine is in tile range of:

A. 50-250   B. 10-35

C. 150–200   D. All of these

Ans. A

60. The specific speed (N_s) of a pump is given by the expression

A. $N_s = \dfrac{N\sqrt{Q}}{H_m^{5/4}}$ B. $N_s = \dfrac{N\sqrt{P}}{H_m^{3/4}}$

C. $N_s = \dfrac{N\sqrt{Q}}{H_m^{3/4}}$ D. $N_s = \dfrac{N\sqrt{P}}{H_m^{5/4}}$

Ans. C

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