

BSNL Whole Testpaper Placement Paper 20 Aug 2010 Not Specified

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BSNL-JTO

CE-CIVIL CIVIL ENGINEERING

Code

C

Time Allowed: three Hrs.

Section-I

ques. Number 1-20 carry one mark every

1. A brick laid with its length across the wall is known as a

- (A) stretcher (B) header (C) closer (D) bat

2. Which of the subsequent is not a mobile crane type?

(A) Bottom slewing tower crane

(B) Telescopic-boom truck mounted crane

(C) Crawler crane

(D) Lattice-boom truck mounted crane

3. A principle plane is a plane of

(A) minimum tensile stress (C) maximum shear stress

(B) maximum tensile stress (D) zero shear stress

4. (i) Rapid hardening Portland cement is used in mass concrete construction for lowering the heat of hydration.

(ii) Rapid hardening Portland cement is blended cement.

Which of the subsequent choice is correct?

(A) (i) is false and (ii) is true

(C) Both (i) and (ii) is false

(B) (i) is actual and (ii) is false

(D) Both (i) and (ii) is actual

5. Which of the subsequent statement is true?

(A) The nominal dimension of a brick is greater than its specified dimension by thickness of the mortar joint.

(B) The nominal dimension of a brick is less than its specified dimension by thickness of the mortar joint.

(C) The nominal dimension of a brick is equal to its specified dimension.

(D) The nominal dimension of a brick is less than its specified dimension by twice the thickness of the mortar joint.

6. Which of the subsequent equipment is used primarily to excavate beneath the natural ground surface on which it rests?

- | | | | |
|----------------------|--------------|---------|---------|
| (A) Dozer
crusher | (B) Scrapper | (C) Hoe | (D) Jaw |
|----------------------|--------------|---------|---------|

7. The phenomenon in which, a few of the water in the mix tends to rise to the freshly placed concrete is known as

- | | | | |
|----------------------------|--------------|-------------|-----|
| (A) flash set
hydration | (B) bleeding | (C) setting | (D) |
|----------------------------|--------------|-------------|-----|

8. In a network diagram, the early begin time of an activity is

- (A) the minimum of the late finish times of all its immediate predecessors
- (B) the minimum of the early finish times of all its immediate predecessors
- (C) the maximum of the late finish times of all its immediate predecessors
- (D) the maximum of the early finish times of all its immediate predecessors

9. Which of the subsequent compound is most widely used as an accelerating admixture in concrete?

- | | | | |
|-------------------------|----------------------|------------------------|---------------|
| (A) Sugar
detergents | (B) Calcium chloride | (C) Soluble zinc salts | (D) Synthetic |
|-------------------------|----------------------|------------------------|---------------|

10. Which method of compaction is improper for sand?

(A) Impact Kneading (B) Pressure (C) Vibration (D)

11. Partial safety factor for concrete and steel in limit state method of design of RC structures are presumed as

(A) 1.35 and 1.2 respectively (C) 1.08 and 1.25 respectively

(B) 1.14 and 1.25 respectively (D) 1.5 and 1.15 respectively

12. Which of the subsequent is not a soft wood?

(A) Oak Spruce (B) Fir (C) Pine (D)

13. In a network diagram, the total float of an activity is equal to

(A) (Late finish time)-(Late begin time)

(B) (Late finish time)-(Early finish time)

(C) (Early finish time)-(Early begin time)

(D) (Late begin time)-(Early finish time)

14. As per IS 456 : 2000, the maximum spacing of steel bars in a reinforced concrete solid slab is

(A) 300 mm

(B) 450 mm

(C) three times effective depth or 300 mm whichever is less

(D) three times the effective depth

15. Which of the subsequent is fly ash based blended cement?

(A) Portland slag cement

(C) Portland pozzolana cement

(B) Low-heat Portland cement

(D) Ordinary Portland cement

16. Which of the subsequent test is performed on hardened concrete to assess the hardness of its surface?

(A) Rebound hammer test

(C) Initial surface absorption test

(B) Ultrasonic pulse velocity test

(D) Flexural test

17. In a PERT network, the optimistic time, pessimistic time and most likely time of an activity are four days, 16 days and seven days respectively. What is the value of the expected duration of the activity?

- (A) 27 days (B) eight days (C) 12 days
(D) 19 days

18. (i) The addition of fly ash in concrete lowers the heat of hydration in concrete.

(ii) The addition of fly ash in concrete decreases its permeability.

Which of the subsequent choice is correct?

- (A) (i) is false and (ii) is true (C) Both (i) and (ii) are false
(B) (i) is actual and (ii) is false (D) Both (i) and (ii) are actual

19. The crack resulting in lengthwise separation of wood, occurring ranging from and parallel to annual rings is known as

- (A) check (B) knot (C) split (D) shake

20. Which of the subsequent compound is mainly responsible for the early strength development of hydrated Portland cement?

(A) C3S

(B) C2S

(C) C3A

(D) C4AF

ques. Number 21-50 carry two marks every

21. A cantilever beam of length l and flexural rigidity EI is subjected to a clockwise couple M_o at the free end. The downward deflection at the free end will be

(A) $M_o l^2 / \text{two } EI$

(B) $M_o l^2 / \text{four } EI$

(C) $M_o l^2 / \text{six } EI$

(D) $M_o l^2 / \text{eight } EI$

22. A simply supported beam of span L carries 2 vertical point loads W at $L/3$ from both ends. The equivalent uniformly distributed load to produce identical maximum bending moment as that of the 2 concentrated loads on the beam is

(A) $4W/L$

(B) $3W/8$

(C) $8W/3L$

(D) $4W/3L$

23. A beam simply supported at the ends carries uniformly distributed load throughout the span. The depth/breadth ratio is 2:1. Now the identical beam is used without any modification of cross-sectional area to carry the identical uniformly distributed load but with depth/breadth ratio of 1:2. The ratio of maximum deflection of the 1st case to the 2nd case is

(A) 1:2

(B) 1:4

(C) 2:1

(D) 4:1

24. A pin jointed truss as shown beneath is formed by 2 members. The length of inclined member is L and angle ranging from the members meeting at the joint is 30° . The modulus of elasticity and cross-sectional area of 2 members are identical and equal to E and A ,

respectively. The vertical deflection of the joint under load P is provided by

(A) (C)

(B) (D)

25. A 2 span continuous beam ABC ($AB=BC$) is fixed at A and freely supported at B and C. The beam is only loaded in the span BC. The flexural rigidities of 2 spans are equal and supports are at the identical level. If M_A and M_B are the moments at supports A and B respectively, which of the subsequent relationships is correct?

(A) $M_A = M_B$ (C) $M_A = -2 M_B$

(B) $M_A = 0.5 M_B$ (D) $M_A = -0.5 M_B$

26. A concrete beam of rectangular part of 300 mm X 500 mm is pre-stressed with 750 kN force, the centre of pre-stressing steel being 100 mm from the centroid and area of the cross-section about horizontal axis passing through the centroid and area of the cross-section are $3.125 \times 10^9 \text{ mm}^4$ and $1.5 \times 10^5 \text{ mm}^2$ respectively. Neglecting the effect of self weight, the stresses at top and bottom fibres are

(A) five MPa (compressive) and 12 MPa (compressive) respectively

(B) 3.4 MPa (tensile) and 12 MPa (compressive) respectively

(C) one MPa (tensile) and 11 MPa (compressive) respectively

(D) 2.5 MPa (tensile) and 14.5 MPa (compressive) respectively

27. In a 2 dimensional state of stress, direct stresses in x and y direction are +90 MPa and +40 MPa, and shear stress of -30 MPa. If Mohr's circle is drawn with scale of one cm = 10 MPa, then centre of Mohr's circle from the origin is located at a distance of

(A) 3.5 cm

(B) 4.5 cm

(C) 7.5 cm

(D) 6.5 cm

28. A propped cantilever is of length six m. The flexural rigidity of the beam is 10000 kN.m². If the propped end undergoes a settlement of 12 mm, then magnitude of the moment induced at the fixed end is

(A) 20 kN.m

(B) 16 kN.m

(C) 10 kN.m

(D) 0

29. Plastic moment carrying capacity of a rectangular part of width b and depth d is M_p . If f_y is the yield stress of the material, then depth of the part will be provided by

(A)

(B)

(C)

(D)

30. A beam of total length L is fixed at both the ends. There are 2 internal hinges, every is at $\frac{1}{3}$ rd of the span from either end. The beam carries uniformly distributed load w per m run throughout the entire span. The bending moment at the fixed support is

(A) $wL^2/7$

(B) $wL^2/9$

(C) $wL^2/10$

(D) $wL^2/12$

31. A built up part of a steel beam is shown beneath. The centroid of the part is 117 mm from the top fibre. If moment of inertia of the part about centroidal horizontal axis is $6.48 \times 10^6 \text{ mm}^4$ and permissible stress in bending is 165 MPa, then safe load that beam can carry over a simply supported span of four m is

- (A) 21.4 kN (B) 14.3 kN (C) 16.4 kN (D) 18.3 kN

32. Deflection of a simply supported beam of span L and flexural rigidity EI at a distance of x from the left hand support is provided by $y(x) = \frac{A_0 x^3}{6}$, where A_0 is a constant. The distributed loading on the beam will be

- (A) $\frac{A_0 x}{L}$ (C) $\frac{A_0 x^2}{L}$
(B) $\frac{A_0 x^2}{L}$ (D) $\frac{A_0 x^3}{L}$

33. A sample of coarse aggregate has the subsequent info :

Weight of oven dry sample = 565 gm, weight of wet (moist) sample = 600 gm, weight of sample in saturated surface dry condition = 580 gm. elaborate the values of water absorption (%) and free moisture content?

- (A) 2.65% and 3.54% respectively (C) 3.33% and 2.5% respectively
(B) 3.54% and 2.65% respectively (D) 2.5% and 3.33% respectively

34. For a concrete mix of one m³, the water, coarse aggregate and fine aggregate contents are 200 kg, 1200 kg and 600 kg respectively. The water to cement ratio (w/c ratio) by mass is 0.50 and the coarse aggregate content is decreased by 50 kg from their respective original values, what is the new w/c ratio keeping in view that the fine aggregate content and the total volume of all ingredients remain identical in both cases?

- (A) 0.61 (B) 0.41 (C) 0.31 (D) 0.51

35. What is the ratio of target mean strength at 28 days of M 25 grade of concrete to that of M 20 grade of concrete?

Given, s = standard deviation = four N/mm², t = a statistical value, corresponding to 5% of test outcomes beneath the characteristic compressive strength = 1.65.

- (A) 1.25 (B) 1.37 (C) 1.18 (D) 0.8

36. The split-tension test is conducted on a concrete cylinder of length 0.3 m and diameter 0.15 m.

The maximum load applied to the specimen is 200 kN. What is the value of split tensile strength?

- (A) 2.83 N/mm² (C) 5.66 N/mm²
(B) 1.41 N/mm² (D) 4.24 N/mm²

37. A thin cylindrical shell of inside diameter D is subjected to an internal fluid pressure q . If f_y is the yield strength of the material of the cylinder, the minimum thickness of the shell according to maximum shear stress criteria will be

- (A) (B) (C) (D)

38. A bronze sleeve 450 mm external diameter fits accurately over a steel rod of solid circular part 300 mm in diameter as shown in the adjacent figure. If the ratio of modulus of elasticity of steel to bronze is 1.75, then the ratio of maximum flexural stress of steel bar to that of bronze sleeve will be

- (A) 7/6 (B) 6/7 (C) 21/8 (D) 8/21

39. A 2 span continuous beam AB and BC was subjected to concentrated load of 20 kN at middle of span BC. The deflection under the load was 0.02 m(downward) and that in the middle of the span AB was 0.01 m (upward). When 16 kN and 40 kN loads are applied simultaneously at the middle of the span AB and BC respectively, then downward deflection at the middle of span BC will be

- (A) 0.016 m (B) 0.032 m (C) 0.064 m (D) 0.08 m

40. A solid circular shaft (length L) is fixed at 1 end and free at the other is subjected to uniform torque T and bending moment M along its length. If Poisson's ratio of the material is 0.25, strain energy of the shaft can be expressed as

- (A) (C)

(B)

(D)

41. A beam of rectangular cross-section is to be made from a cylindrical log of wood of diameter D . The strongest cross-section of the rectangular beam that can be made should have dimension

(A) $\times D$

(C) $\times D$

(B) $\times D$

(D) $\times D$

42. A plane rigid jointed steel frame with fixed supports is acted upon by a couple M as shown beneath. In order to obtain moment induced at the fixed supports, moment distribution was carried out. The ratio of moment at support A to that at B is

(A) 1:2

(B) 2:1

(C) 1:4

(D) 4:1

43. A propped cantilever of span $3L$ is having plastic moment carrying capacity M_p . It carries a concentrated load at a distance of L from the fixed end. Collapse load for the beam is

(A) $2M_p / L$

(B) M_p / L

(C) $2.5M_p / L$

(D) $1.5M_p / L$

44. In a RC beam of rectangular cross-section (breadth = 200 mm; effective depth = 350 mm), vertical stirrups 2-legged eight mm diameter are given at a spacing of 200 mm c/c. Given, cross-sectional area of eight mm bar (Fe 415) = 50.3 mm², and design shear strength of concrete is 0.5 MPa, total shear capacity of the part will be

- (A) 64.68 kN (B) 72.45 kN (C) 115.38 kN (D) 98.56 kN

45. A beam of length L is fixed at both ends. The beam carries uniformly distributed load of intensity w per unit length covering the entire span. The points of contra-flexure are at

- (A) - from both ends (C) - from both ends
(B) - from both ends (D) - from both ends

46. A steel column of hollow circular cross-section (external diameter = D and internal diameter = d) hinged at both ends is subjected to compressive load. If the length of the column is L and modulus of elasticity of steel is E , the critical stress of column according to Euler's formula will be

- (A) $(D^2 + d^2)$ (C) $(D^2 + d^2)$
(B) $(D^2 + d^2)$ (D) $(D^2 + d^2)$

47. A rivet of 20 mm diameter is used to connect 10 mm thick plate. The permissible stress for rivet in shear and bearing are 80 MPa and 250 MPa, respectively. The difference of rivet value in double and single shear is

- (A) 29044 N (B) 26875 N (C) 24706 N (D) 23868 N

48. A semi-circular arch of radius R hinged at 2 ends and at the crown carries uniformly distributed load q per unit length. The normal thrust at the crown will be

- (A) $q R / 2$ (B) $q R / 4$ (C) $q R / 8$ (D) $q R$

49. The effective length of fillet welded joint is 210 mm. If the size of the weld is six mm and permissible stress is 108 MPa, the safe load that the joint can transmit is

- (A) 95256 N (B) 85256 N (C) 78206 N (D) 108000 N

50. The ratio of maximum shear stress to avg. shear stress in a solid circular cross-section is

- (A) 1.11 (B) 1.22 (C) 1.33 (D) 1.44

Section-II

ques. Number 1-20 carry one mark every

1. As per USCS classification, the diameter of silt size particle is less than

- (A) 0.075 mm (B) 0.002 mm (C) 0.02 mm (D) 0.75 mm

2. Specific quantity of soil is 1.9. Its porosity is

- (A) 0.9 (B) 0.47 (C) 2.11 (D) 1

3. In a compaction test, MDD stands for maximum dry density and OMC for optimum moisture content. As compaction energy increases,

- (A) Both MDD and OMC increases
(B) MDD reduces and OMC increases
(C) MDD increases and OMC reduces
(D) No change in MDD and OMC

4. Let τ represent shear strength, c cohesion, σ effective normal stress and ϕ angle of internal friction, then according to Coulomb's shear strength model

- (A) $\tau = \sigma + c \tan \phi$ (C) $\sigma = c + \tau \tan \phi$
(B) $\sigma = \tau + c \tan \phi$ (D) $\tau = c + \sigma \tan \phi$

5. The bearing capacity of soil supporting a footing of size three m X three m will not be affected by the presence of water table located at a minimum depth beneath the base of footing by

- (A) 1.0 m (B) 1.5 m (C) 3.0 m (D) 6.0 m

6. Parallax fault in levelling is due to a condition where

- (A) Image formed by objective is in the plane of cross hair
- (B) Image formed by objective is not in the plane of cross hair
- (C) Image formed by eyepiece is in the plane of cross hair
- (D) Image formed by eyepiece is not in the plane of cross hair

7. Sag correction is applicable while using

- (A) Dumpy level on a sloping ground (C) Tape for linear measurement
- (B) Plane table by 2 point problem (D) Theodolite for measuring height

8. Which of the subsequent tests is not conducted on bituminous material?

- (A) Penetration test (C) Vebe test
- (B) Viscosity test (D) Softening point test

9. What is the value of radius of relative stiffness for a 250 mm thick cement concrete slab resting on a subgrade? Given, Poisson's ratio of concrete = 0.15, modulus of elasticity of concrete = 26950 N/mm² and modulus of subgrade reaction equal to 0.064 N/mm³.

- (A) 2996 mm (B) 675 mm (C) 1309 mm (D) 865 mm

10. Fish plates are used

(A) In rail joints for maintaining the continuity of rails

(B) For joining cast iron sleepers with rails

(C) For joining pre-stressed concrete sleepers with rails

(D) To divert train from 1 track to a different

11. To avoid tension on the bottom of a gravity dam of bottom width b , the eccentricity must be less than

- (A) $b/2$ (B) $b/3$ (C) $2b/3$ (D) $b/6$

12. A channel with a mild slope is followed by a steep bottom slope. The profile of the gradually varied flow will be

(A) M1-S2 M2-S1	(B) M2-S2	(C) M1-S1	(D)
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13. Identify the actual statement from the following:

- (A) A reciprocating pump will be called double acting reciprocating pump if it has 2 cylinders.
- (B) A reciprocating pump will be called double acting reciprocating pump if it has 2 pistons.
- (C) In case of double acting reciprocating pump, the liquid is in contact with 1 side of the piston.
- (D) In case of double acting reciprocating pump, the liquid is in contact with both sides of the piston.

14. Flood routing is a procedure to determine

- (A) time and magnitude of flow at a point on a water course from known upstream hydrograph.
- (B) the discharge over the spillway and through sluice gate.
- (C) reservoir storage.
- (D) the head available at the power plant.

15. Ideal fluids are those fluids which

- (A) have no viscosity
- (B) have surface tension
- (B) have viscosity
- (D) are compressible

16. Hygroscopic water is a film water chemically bound to soil particles by adhesive force and

- (A) is available to plants
- (B) is not available to plants
- (C) can be drained out by gravity
- (D) is capable of movement by capillary force

17. Modern turbidimeters, working on the principle of "scattering of light", are known as

- (A) Optimeters
- (C) Nephelometers
- (B) Tintometers
- (D) pH meter

18. Pollution by depletion of ozone layer, threatening the environment, is caused due to the reaction of ozone with

(A) Carbon monoxide

(C) Sulfur dioxide

(B) Chlorofluorocarbon(CFC)

(D) Oxygen

19. The water to be used for boilers should preferably be

(A) Hard
Soft

(B) Potable

(C) Corrosive

(D)

20. If Q is the flow rate of water into a rectangular sedimentation tank of length L, width B and height H, then the surface loading rate is provided by

(A)

(B)

(C)

(D)

ques. Number 21-50 carry two marks every

21. A soil sample of specific gravity 2.7 has void ratio of 0.9. The gravimetric water content of the sample is 25%. Its bulk unit weight is

(A) 13.9 kN/m³

(B) 17.4 kN/m³

(C) 18.6 kN/m³

(D) 8.8KN/m³

22. A bulk weight of 200 g of silty soil of specific gravity 2.64 is packed in a quantity of 115 cc.

Oven dried weight of soil is 170 g. The saturation of the sample is

- (A) 25% (B) 30% (C) 75% (D) 60%

23. For a falling head permeability test, there is a drop in head from 64 cm to 54 cm in eight minutes. The area of stand pipe is one cm² and area of soil sample is 20 cm². Length of soil sample is 10 cm. The permeability of the soil sample is

- (A) 1.8×10^{-4} cm/s (C) 4.1×10^{-1} cm/s
(B) 1.4×10^{-1} cm/s (D) 1.8×10^{-3} cm/s

24. A 30 cm diameter concrete pile is driven into a homogenous clay deposit with cohesion equal to 40 kN/m² and adhesion factor is equal to 0.7. Embedded length of the pile is 115 kN. presume N_c equal to nine and there is both end resistance. The factor of safety is

- (A) 2.3 (B) 0.4 (C) 1.2 (D) 2.5

25. Sea bed is 200 m deep, which consist of sand with saturated unit weight of 19.81 kN/m³. Effective stress at five m beneath sea bed is

- (A) 2061 kN/m² (B) 50 kN/m² (C) 99 kN/m² (D) 2012 kN/m²

26. Coefficient of consolidation for a clay layer is provided as six $\times 10^{-7}$ m²/minute. The time factor for 90% degree of consolidation is 0.848. Liquid limit of clay is 50%. The saturated clay layer is three m thick with double drainage condition. The time needed for 90% consolidation is

- (A) 5.3×10^4 hours (C) 2.65×10^4 hours
- (B) 2.12×10^5 hours (D) 1.06×10^5 hours

27. For an unconsolidated undrained (UU) test, major and minor principal stress for silty clay is 200 kN/m^2 and 100 kN/m^2 , respectively. Shear strength parameters for this soil sample is

- (A) $c = 200 \text{ kN/m}^2$; $\phi = 20^\circ$ (C) $c = 50 \text{ kN/m}^2$; $\phi = 0^\circ$
- (B) $c = 100 \text{ kN/m}^2$; $\phi = 20^\circ$ (D) $c = 200 \text{ kN/m}^2$; $\phi = 10^\circ$

28. A vertical cut is made in a soil with shear strength parameters of $c \approx 0$ and $\phi = 12^\circ$. Coefficient of active earth pressure is 0.656. Unit weight of soil is 18 kN/m^3 . The active earth pressure at four m depth is

- (A) 47 kN/m^2 (B) three kN/m^2 (C) 72 kN/m^2 (D) 110 kN/m^2

29. A 10 m thick layer with unit weight of 20 kN/m^3 overlies sandy deposit of four m thick. The piezometric head at the bottom of the clay layer is 18 m. The safe depth of excavation possible in clay layer without causing instability is

- (A) 8.8 m (B) 6.1 m (C) 4.9 m (D) 1.2 m

30. The subsequent bearings are observed in running a closed traverse by compass survey.

Line	Fore bearing	Back bearing
ab 20°	75° 5'	254°
bc 35°	115° 20'	296°
cd 35°	165° 35'	345°

Local attraction issue exists at stations:

- (A) c stations (B) d (C) a, b (D) All

31. A theodolite was set up at station P and angle of elevation measured to a vane four m above the foot of levelling staff held at Q is 9°. Horizontal distance ranging from P and Q is 2000 m. decreased level of instrument axis is 2650 m. Assuming negligible correction, the decreased level of staff station Q is

- (A) 2654 m (B) 2967 m (C) 2963 m (D) 2650 m

32. decreased level of bottom of sunshade, $\tilde{a}$ is 63.120 m. The subsequent readings were found using a level:

Readings on inverted staff at a is 2.235 m

Readings on the top of peg p on the ground is 1.035 m

The height difference ranging from a and p is

- (A) 2.235 m (B) 1.195 m (C) 3.270 m (D) 1.035 m

33. The distance ranging from 2 posts measured with a 20 m chain was obtained to be 250 m. If the chain is 10 cm too long, then the actual distance ranging from the posts is

- (A) 251.25 m (B) 250.10 m (C) 248.75 m (D) 249.90 m

34. The accurate sequence of the anaerobic sludge digestion steps is

- (A) Acid formation, hydrolysis, methane formation
- (B) Methane formation, acid formation, hydrolysis
- (C) Hydrolysis, methane formation, acid formation
- (D) Hydrolysis, acid formation, methane formation

35. If a sample of air is analysed at standard temperature and pressure, and is obtained to contain 0.3 ppm of sulphur dioxide, the equivalent SO₂ concentration in Åµg/m³ will be (Given atomic weight of S=32 g and O= 16g)

- (A) 8570
0.857
- (B) 857
- (C) 85.7
- (D)

36. Match the List I with List II and choose the accurate ans using the codes provided beneath the lists :

List I

List II

(Treatment Units)

(Detention Time)

- | | |
|--------------------------|-----------------|
| a. Grit Chamber | i. 6 hours |
| b. Primary Sedimentation | ii. 2 minutes |
| c. Sludge digestion | iii. 2 hours |
| d. Activated sludge | iv. Twenty days |

Codes a. b. c. d.

- (A) i. ii. iii. iv.

(B) ii. iii. iv. i.

(C) i. iv. iii. ii.

(D) ii. i. iii. iv.

37. A 10 min. triangular unit hydrograph has peak discharge of 100 m³/sec and time to peak is 30 min. The peak discharge and time to peak of the direct runoff hydrograph resulting from a 20 min. storm having 0.2 cm rainfall in the 1st 10 min. is (consider ϕ -index of 1.2 cm/hr)

(A) 80 m³/sec and 40 min.

(C) 20 m³/sec and 30 min.

(B) 20 m³/sec and 40 min.

(D) 100 m³/sec and 30 min.

38. The velocity field can be represented by

$$\mathbf{V} = (3x+py+qz)\hat{i} + (rx+2y+4z)\hat{j} + (sx+6y+tz)\hat{k}$$

Where p, q, r, s, t are constants. If the fluid is incompressible and conserve mass, then the value of t is

(A) 5

(B) -5

(C) 3

(D) 1

39. A channel carrying a discharge of 20 m³/sec. The avg. velocity of flow in the channel for f=

one as per Lacey's regime theory is

- (A) 0.723 m/sec (B) 7.23 m/sec (C) 72.3 m/sec (D) 0.0723 m/sec

40. An irrigation canal has culturable command area of 28,000 hectares. The intensity of irrigation for Kharif season is 25% and for Rabi season is 60%. If the duty at its head is 700 hectares/cumec for Kharif season and 1680 hectares/cumec for Rabi season, then the discharge at the head of the canal is

- (A) two cumec (B) 20 cumec (C) 10 cumec (D) 200 cumec

41. A quantity of $2.0 \times 10^6 \text{ m}^3$ of groundwater was pumped out uniformly from an unconfined aquifer of 200 km² area. If the specific yield of the aquifer is 0.005, the water table of the aquifer was lowered down by

- (A) two m five m (B) 10 m (C) eight m (D)

42. A U-tube manometer is organized as shown in figure beneath to measure the pressure difference ranging from point A and point B in a pipeline conveying water of density 1000 kg/m³. The density of the manometer fluid is $10 \times 10^3 \text{ kg/m}^3$. The pressure difference ranging from A and B when $h = 1.0 \text{ m}$ is (take $g = 10 \text{ m/sec}^2$)

- (A). 90 kN/m² (B) 100 kN/m² (C) nine kN/m²
(D) 900 kN/m²

43. A rectangular channel has a width of two m. The channel carries a discharge of four m³/sec with depth of water of one m. At a certain part in the channel, it is proposed to construct a smooth hump. The maximum height of the hump that can be constructed without any change in the upstream depth of the channel is

- (A) 0.9 m (B) 1.20 m (C) 0.09 m (D) 1.11 m

44. Head loss ranging from part A and B of a circular pipe of diameter 100 mm is 0.40 m. The avg. velocity of flow is 1.26 m/sec and Darcy's frictional coefficient is 0.008. The length of the pipe ranging from part A and B is

- (A) 154.48 m (B) 1.54 m (C) 18.50 m (D) 15.45 m

45. What is the population equivalent of a city if the avg. sewage from the city is 95 X 10⁶ l/day, and the avg. five day BOD is 300 mg/l? presume that per capita BOD₅ of sewage per day = 0.08 kg.

- (A) 2,280 (B) 28,500 (C) 71,250 (D) 3,56,250

46. The mixed liquor suspended solids (MLSS) concentration in the aeration tank of activated sludge process is 4000 mg/l. If 1 litre of sample settled in 30 minutes and the measuring cylinder showed a sludge quantity of 200 ml, then the sludge quantity index would be nearly

- (A) 200 (B) 150 (C) 100 (D) 50

47. If the population of a city is two lakhs, and avg. water consumption is 200 lpcd, then the capacity of the pipe mains should be

- (A) 108 Mld (B) 72 Mld (C) 60 Mld (D) 40 Mld

48. For a water sample having a total hardness of 200 mg/l as CaCO_3 , and alkalinity of 250 mg/l as CaCO_3 , the carbonate hardness and non-carbonate hardness are, respectively

- (A) 50 mg/l and 200 mg/l of CaCO_3 (C) 0 mg/l and 200 mg/l of CaCO_3
(B) 200 mg/l and 50 mg/l of CaCO_3 (D) 200 mg/l and 0 mg/l of CaCO_3

49. A water having pH = nine will have OH^- concentration equal to

- (A) 10^9 mol/l (B) 10^{-9} mol/l (C) 10^{-5} mol/l (D) 10^5

50. The chlorine demand of a water sample was obtained to be 0.2 mg/l. The amount of bleaching powder containing 30% available chlorine to be added to treat 1 litre of such a water sample is

- (A) 0.67 mg (B) 0.06 mg (C) 1.33 mg (D) 0.14 mg

Section-III

All ques. carry one mark every

1. Who was the 1st woman to be elected as the President of the Indian National Congress?

(A) Sarojini Naidu

(C) Indira Gandhi

(B) Sonia Gandhi

(D) Annie Besant

2. Which political leader delivered the famous "I have a dream" speech?

(A) Jawaharlal Nehru

(C) Martin Luther King

(B) Winston Churchill

(D) Rabindranath Tagore

3. Who established the organization "Khudai Khidmatgar"?

(A) Hyder Ali

(C) Maulana Abul Kalam Azad

(B) Gopal Krishna Gokhale

(D) Khan Abdul Ghaffar Khan

4. Analgesics are drugs used to prevent or relieve

(A) aches and pain

(C) hormone deficiency

(B) fever and high body temperature

(D) stress and anxiety

5. The abbreviation CD stands for

(A) Circular Disc

(C) Compact Disc

(B) Computer Device

(D) Code-Demodulator

6. Chandrayaan-I, India's 1st mission to the moon, has 11 scientific instruments that are being released on the surface of the moon. These instruments are together known as

(A) Moon Impact Probes

(C) Scientific Payloads

(B) Terrain Mapping Cameras

(D) Spectrometers

7. The World Wide Web was invented by

(A) Tim Berners-Lee

(C) Sabeer Bhatia

(B) Narayanmurthy

(D) Charles Babbage

8. How many diagonals does a quadrilateral have?

- (A) one (B) two (C) four (D) eight

9. ISO 14000 standards deal with

- (A) Quality management (C) Human resource management
(B) Production management (D) Environmental management

10. Which Indian politician's autobiography is titled The Story of My Life?

- (A) Morarji Desai (C) Lal Krishna Advani
(B) Mahatma Gandhi (D) Atal Behari Vajpayee

11. The phrase "through thick and thin" means

- (A) big and small (C) large object
(B) thin and fat (D) under all conditions

12. Picturesque means

(A) photogenic (B) simple (C) stimulating (D) ugly

13. Diligent means

(A) intelligent (B) energetic (C) modest
(D) industrious

14. The opposite of miserly is

(A) spendthrift (B) generous (C) liberal (D) charitable

15. The opposite of ingratitude is

(A) sympathy (B) reward (C) thankfulness (D)
stimulation

16. The improper missing word in the blank space in the sentence "I prefer coffee _____ tea."

(A) than (B) over (C) for (D) to

17. The improper missing word in the blank space in the sentence "Many relatives attended _____ him during his illness."

(A) of (B) on (C) for (D) with

18. The article needed before the word "one-eyed" in the sentence "There was _____ one-eyed beggar by the multiplex." is

(A) the (B) a (C) an (D) nil

19. The article needed before the word University in the sentence "She met Professor Shah at _____ University." is

(A) A (B) an (C) the (D) nil

20. Which 1 is the accurate sentence amongst the subsequent sentences?

(A) Mr. Gupta, accompanied by his friends, were assembled on the lawns.

(B) Mr. Gupta, accompanied by his friends, are assembled on the lawns.

(C) Mr. Gupta, accompanied by his friends, assembled on the lawns.

(D) Mr. Gupta, accompanied by his friends, have assembled on the lawns.

Answers

part I

- | | | |
|-------------------|---------|-----|
| 1. (A)
(D) | 41. (B) | 29. |
| 2. (A)
30. (C) | 42. (D) | |
| 3. (D)
31. (C) | 43. (A) | |
| 4. (C)
32. (A) | 44. (D) | |
| 5. (A)
(A) | 45. (B) | 33. |
| 6. (C)
34. (A) | 46. (D) | |
| 7. (B)
35. (B) | 47. (C) | |

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8. (D) (B)	48. (A)	36.
9. (B) (B)	49. (A)	37.
10. (C) (B)	50. (C)	38.
11. (D)	part II	39. (A)
12. (A) (C)		40.
13. (B) (A)	1. (A)	41.
14. (C) (A)	2. (B)	42.
15. (C) (C)	3. (C)	43.
16. (A) (D)	4. (D)	44.
17. (B) (D)	5. (C)	45.

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18. (D) (D)	6. (B)	46.
19. (D) (B)	7. (C)	47.
20. (A) (D)	8. (C)	48.
21. (A) (C)	9. (D)	49.
22. (C) (A)	10. (A)	50.
23. (B) III	11. (D)	part
24. (A)	12. (B)	
25. (C) (D)	13. (D)	1.
26. (C) (C)	14. (A)	2.

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27. (D) (D)	15. (A)	3.
28. (C) (A)	16. (B)	4.
29. (B) (C)	17. (C)	5.
30. (B) (C)	18. (B)	6.
31. (D) (A)	19. (D)	7.
32. (D) (B)	20. (A)	8.
33. (A) (D)	21. (B)	9.
34. (B) 10. (C)	22. (D)	
35. (C) 11. (D)	23. (A)	
36. (A)	24. (D)	

12. (A)

37. (B)

13. (D)

25. (B)

38. (A)

26. (A)

14. (D)

39. (B)

27. (C)

15. (C)

40. (D)

28. (A)

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