

GATE-2012

Question Paper

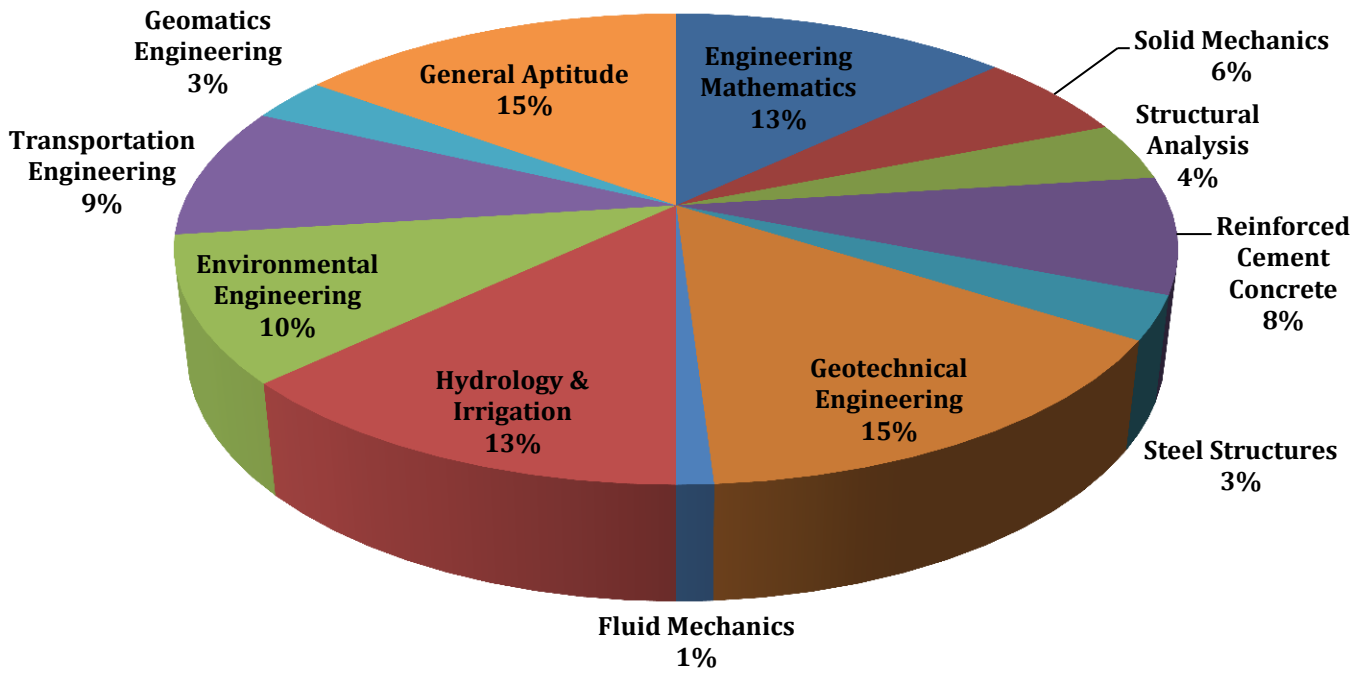
&

Answer Keys

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1. Question Paper Analysis
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ANALYSIS OF GATE 2012 Civil Engineering



GATE-2012- CE

SUBJECT	NO OF QUESTION	Topics Asked in Paper	Total Marks
Engineering Mathematics	1M:3 2M:5	Numerical Methods Probability and Distribution Calculus Numerical Methods Linear Algebra Differential Equations	13
Solid Mechanics	1M:4 2M:1	Simple Stress & Strain Shear Force and Bending Moment Complex Stress & Strain Columns and Struts	6
Structural Analysis	1M:0 2M:2	Slope and Deflection Method Matrix Method of Structural Analysis	4
Reinforced Cement Concrete	1M:2 2M:3	Analysis of Ultimate Load Capacity Design of Pre-Stressed Concrete Beams Design of RCC Structures	8
Steel Structures	1M:1 2M:1	Simple Connections Welded Connections	3
Geotechnical Engineering	1M:5 2M:5	Shear Strength Compaction Index Properties and Soil Classification Earth Pressure Bearing Capacity Permeability and Seepage Consolidation	15
Fluid Mechanics	1M:1 2M:0	Flow Through Pipes	1
Hydrology & Irrigation	1M:3 2M:5	Open Channel Flow Hydrology water Requirements of Crops	13
Environmental Engineering	1M:2 2M:4	Domestic Waste Water Treatment Waste Water Treatment Quality Standards of Water Water Supply and its Treatment	10
Transportation Engineering	1M:3 2M:3	Intersection Design Testing and Specifications of Paving Materials design of Rigid Flexible Pavements Geometric Design of Highway Traffic Signs and Signal Design	9
Geomatics Engineering	1M:1 2M:1	Leveling	3
General Aptitude	1M:5 2M:5	Numerical Ability Verbal Ability	15
Total	65		100

**GATE 2012 Examination
CIVIL ENGINEERING**

Q.1 to Q. 25 carries one mark each.

1. The estimate of $\int_{0.5}^{1.5} \frac{dx}{x}$ obtained using Simpson's rule with three - point function evaluation exceeds the exact value by
 (A) 0.235 (C) 0.024
 (B) 0.068 (D) 0.012
[Ans. D]

2. The annual precipitation data of a city is normally distributed with mean and standard deviation as 1000mm and 200 mm, respectively. The probability that the annual precipitation will be more than 1200 mm is
 (A) < 50 % (C) 75 %
 (B) 50 % (D) 100 %
[Ans. A]

3. The infinite series
 $f(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} \dots \dots \dots \infty$ converges to
 (A) $\cos(x)$ (C) $\sinh(x)$
 (B) $\sin(x)$ (D) e^x
[Ans. B]

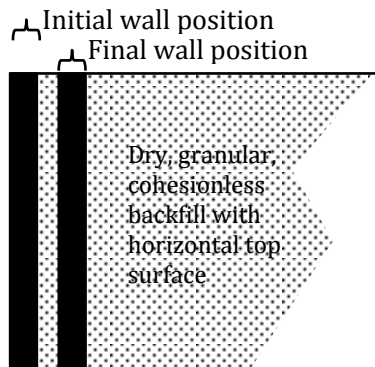
4. The poisson's ratio is defined as
 (A) $\frac{\text{axial stress}}{\text{lateral stress}}$ (C) $\frac{\text{lateral stress}}{\text{axial stress}}$
 (B) $\frac{\text{lateral strain}}{\text{axial strain}}$ (D) $\frac{\text{axial strain}}{\text{lateral strain}}$
[Ans. B]

5. The following statements are related to bending of beams:
 I. The slope of the bending moment diagram is equal to the shear force.
 II. The slope of the shear force diagram is equal to the load intensity
 III. The slope of the curvature is equal to the flexural rotation
 IV. The second derivative of the deflection is equal to the curvature
 The only **FALSE** statements is
 (A) I (C) III
 (B) II (D) IV
[Ans. C]

6. If a small concrete cube is submerged deep in still water in such a way that the pressure exerted on all faces of the cube is p, then the maximum shear stress developed inside the cube is
 (A) 0 (C) p
 (B) p/2 (D) 2p
[Ans. A]

7. As per IS 456:2000 for M20 grade concrete and plain bars in tension the design bond stress $\tau_{bd} = 1.2$ MPa. Further, IS 456:2000 permits this design bond stress value to be increased by 60% for HSD bars. The stress in the HSD reinforcing steel bars in tension, $\sigma_s = 360$ MPa. Find the required development length, L_d , for HSD bars in terms of the bar diameter, ϕ _____
[Ans. *] Range: 46 to 47
8. Which one of the following is categorized as a long-term loss of prestress in a prestressed concrete member?
(A) Loss due to elastic shortening (C) Loss due to relaxation of strands
(B) Loss due to friction (D) Loss due to anchorage slip
[Ans. C]
9. In a steel plate with bolted connections, the rupture of the net section is a mode of failure under
(A) Tension (C) Flexure
(B) Compression (D) Shear
[Ans. A]
10. The ratio of the theoretical critical buckling load for a column with fixed ends to that of another column with the same dimensions and material, but with pinned ends, is equal to
(A) 0.5 (C) 2.0
(B) 1.0 (D) 4.0
[Ans. D]
11. The effective stress friction angle of a saturated, cohesion less soil is 38° . The ratio of shear stress to normal effective stress on the failure plane is
(A) 0.781 (C) 0.488
(B) 0.616 (D) 0.438
[Ans. A]
12. Two series of compaction test were performed in the laboratory on an inorganic clayey soil employing two different levels of compaction energy per unit volume of soil. With regard to the above tests, the following two statements are made.
I. The optimum moisture content is expected to be more for the tests with higher energy.
II. The maximum dry density is expected to be more for the tests with higher energy.
The correct option evaluating the above statement is.
(A) Only I is TRUE (C) Both I and II are TRUE
(B) Only II is TRUE (D) Neither I nor II is TRUE
[Ans. B]
13. As per the Indian Standard soil classification system, a sample of silty clay with liquid limit of 40% and plasticity index of 28% is classified as
(A) CH (C) CL
(B) CI (D) CL - ML
[Ans. B]

14. A smooth rigid retaining wall moves as shown in the sketch causing the backfill material to fail. The backfill material is homogeneous and isotropic, and obeys the Mohr – Coulomb failure criterion. The major principal stress is



- (A) Parallel to the wall face and acting downwards
(B) Normal to the wall face
(C) Oblique to the wall face acting downwards
(D) Oblique to the wall face acting upwards

[Ans. B]

15. An embankment is to be constructed with a granular soil (bulk unit weight = 20kN/m^3) on a saturated clayey silt deposit (undrained shear strength = 25 kPa). Assuming undrained general shear failure and bearing capacity factor of 5.7, the maximum height (in m) of the embankment at the point of failure is

- (A) 7.1 (B) 5.0 (C) 4.5 (D) 2.5

[Ans. A]

16. A trapezoidal channel is 10.0 m wide at the base and has a side slope of 4 horizontal to 3 vertical. The bed slope is 0.002. The channel is lined with smooth Concrete (Manning's $n = 0.012$). The hydraulic radius (in m) for a depth of flow of 3.0 m is

- (A) 20.0 (B) 3.5 (C) 3.0 (D) 2.1

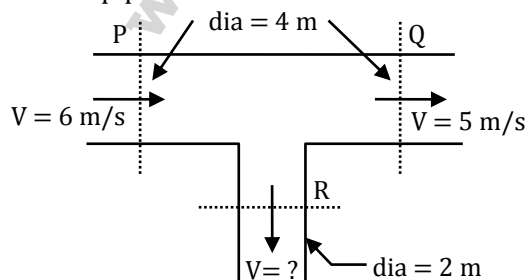
[Ans. D]

17. A rectangular open channel of width 5.0m is carrying a discharge of $100\text{ m}^3/\text{s}$. The Froude number of the flow is 0.8. The depth of flow (in m) in the channel is

- (A) 4 (B) 5 (C) 16 (D) 20

[Ans. A]

18. The circular water pipes shown in the sketch are flowing full. The velocity of flow (in m/s) in the branch pipe "R" is



- (A) 3 (B) 4 (C) 5 (D) 6

[Ans. B]

19. The ratio of actual evapo – transpiration to potential evapo – transpiration is in the range
 (A) 0.0 to 0.4 (C) 0.0 to 1.0
 (B) 0.6 to 0.9 (D) 1.0 to 2.0

[Ans. C]

20. A sample of domestic sewage is digested with silver sulphate, sulphuric acid, potassium dichromate and mercuric sulphate in chemical oxygen demand (COD) test. The digested sample is then titrated with standard ferrous ammonium sulphate (FAS) to determine the un – reacted amount of
 (A) Mercuric sulphate (C) Silver sulphate
 (B) Potassium dichromate (D) Sulphuric acid

[Ans. B]

21. **Assertion [a]:** At a manhole, the crown of the outgoing sewer should not be higher than the crown of the incoming sewer.
Reason [r]: Transition from a larger diameter incoming sewer to a smaller diameter outgoing sewer at a manhole should not be made.

The **CORRECT** option evaluating the above statements is

- (A) Both [a] and [r] are true and [r] is the correct reason for [a]
 (B) Both [a] and [r] are true but [r] is not the correct reason for [a]
 (C) Both [a] and [r] are false
 (D) [a] is true but [r] is false

[Ans. D]

22. Two major roads with two lanes each are crossing in an urban area to form an un-controlled intersection. The number of conflict points when both roads are one-way is “X” and when both roads are two-way is “Y”. the ratio of X to Y is
 (A) 0.25 (C) 0.50
 (B) 0.33 (D) 0.75

[Ans. A]

23. Two bitumen samples X and Y have softening points 45°C and 60, respectively. Consider the following
 I. Viscosity of X will be greater than that of Y at the same temperature
 II. Penetration value of X is lesser than that of Y under standard conditions

The correct option evaluating the above statement is

- (A) Both I and II are true (C) Both are false
 (B) I is false and II is true (D) I true and II false

[Ans. C]

24. Road roughness is measured using
 (A) Benkelman beam (C) Dynamic cone penetrometer
 (B) Bump integrator (D) Falling weight deflectometer

[Ans. B]

25. Which of the following errors can be eliminated by reciprocal measurements in differential leveling?
- I. Error due to earth's curvature
 II. Error due to atmospheric refraction
- (A) Both I and II (C) II only
 (B) I only (D) Neither I nor II

[Ans. B]

Q. 26 - Q. 55 carry two marks each.

26. The error in $\left. \frac{d}{dx} f(x) \right|_{x=x_0}$ for a continuous function estimated with $h=0.03$ using the central difference formula $\left. \frac{d}{dx} f(x) \right|_{x=x_0} = \frac{f(x_0+h) - f(x_0-h)}{2h}$, is 2×10^{-3} . The values of x_0 and $f(x_0)$ are 19.78 and 500.01, respectively. The corresponding error in the central difference estimate for $h = 0.02$ is approximately
- (A) 1.3×10^{-4} (C) 4.5×10^{-4}
 (B) 3.0×10^{-4} (D) 9.0×10^{-4}

[Ans. D]

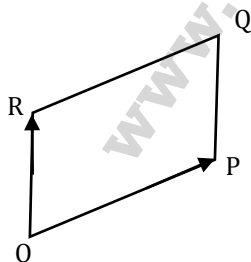
27. In an experiment, positive and negative values are equally likely to occur. The probability of obtaining at most one negative value in five trials is
- (A) 1/32 (C) 3/32
 (B) 2/32 (D) 6/32

[Ans. D]

28. The Eigenvalues of matrix $\begin{bmatrix} 9 & 5 \\ 5 & 8 \end{bmatrix}$ are
- (A) -2.42 and 6.86 (C) 4.70 and 6.86
 (B) 3.48 and 13.53 (D) 6.86 and 9.50

[Ans. B]

29. For the parallelogram OPQR shown in the sketch, $\overrightarrow{OP} = a \hat{i} + b \hat{j}$ and $\overrightarrow{OR} = c \hat{i} + d \hat{j}$. The area of the parallelogram is



- (A) $ad - bc$ (C) $ad + bc$
 (B) $ac + bd$ (D) $ab - cd$

[Ans. A]

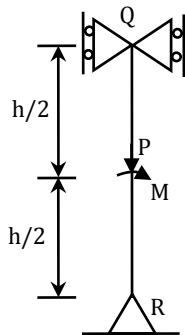
30. The solution of the ordinary differential equation $\frac{dy}{dx} + 2y=0$ for the boundary condition, $y=5$ at $x = 1$ is
- (A) $y = e^{-2x}$ (C) $y = 10.95e^{-2y}$
 (B) $y = 2e^{-2x}$ (D) $y = 36.95e^{-2x}$

[Ans. D]

31. A simply supported beam is subjected to a uniformly distributed load of intensity w per unit length, on half of the span from one end. The length of the span and the flexural stiffness are denoted as l and EI , respectively. The deflection at mid – span of the beam is
- (A) $\frac{5}{6144} \frac{wl^4}{EI}$ (C) $\frac{5}{348} \frac{wl^4}{EI}$
 (B) $\frac{5}{768} \frac{wl^4}{EI}$ (D) $\frac{5}{192} \frac{wl^4}{EI}$

[Ans. B]

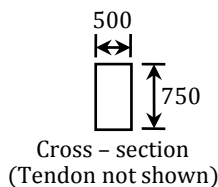
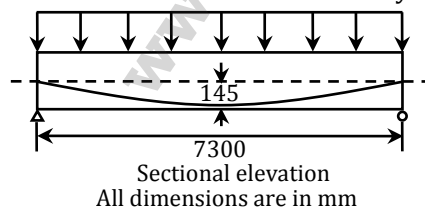
32. The sketch shows a column with a pin at the base and rollers at the top. It is subjected to an axial force P and a moment M at mid – height. The reactions (s) at R is /are



- (A) A vertical force equal to P
 (B) A vertical force equal to $P/2$
 (C) A vertical force equal to P and horizontal force equal to M/h
 (D) A vertical force equal to $P/2$ and a horizontal equal to M/h

[Ans. C]

33. A concrete beam prestressed with a parabolic tendon is shown in the sketch. The eccentricity of the tendon is measured from the centroid of the cross-section. The applied prestressing force at service is 1620 kN. The uniformly distributed load of 45 kN/m includes the self-weight.



The stress (in N/mm^2) in the bottom fiber at mid-span is

- (A) Tensile 2.90 (C) Tensile 4.32
(B) Compressive 2.90 (D) Compressive 4.32

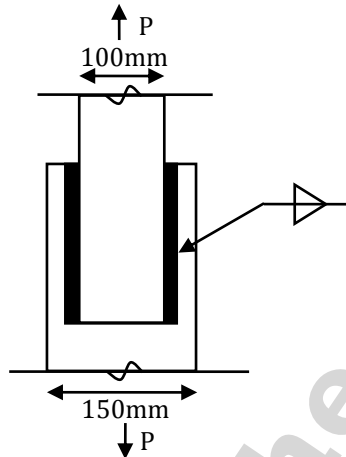
[Ans. B]

34. A symmetric frame PQR consists of two inclined members PQ and QR, connected at 'Q' with a rigid joint, and hinged at 'P' and 'R'. The horizontal length PR is l . If a weight W is suspended at 'Q', the bending moment at 'Q' is

- (A) $\frac{Wl}{2}$ (C) $\frac{Wl}{8}$
(B) $\frac{Wl}{4}$ (D) Zero

[Ans. D]

35. Two plates are connected by fillet welds of size 10 mm and subjected to tension, as shown in the sketch. The thickness of each plate is 12 mm. The yield stress and the ultimate tensile stress of steel are 250 MPa and 410 MPa, respectively. The welding is done in the workshop ($\gamma_{mw} = 1.25$). As per the Limit State Method of IS 800.2007. The minimum length (rounded off to the nearest higher multiple of 5 mm) of each weld to transmit force P equal to 270 kN is



- (A) 100 mm (C) 110 mm
(B) 105 mm (D) 115 mm

[Ans. B]

36. Two soil specimens with identical geometric dimensions were subjected to falling head permeability tests in the laboratory under identical conditions. The fall of water head was measured after an identical time interval. The ratio of initial to final water heads for the test involving the first specimen was 1.25. If the coefficient of permeability of the second specimen is 5-times that of the first, the ratio of initial to final water heads in the test involving the second specimen is

- (A) 3.05 (C) 4.00
(B) 3.80 (D) 6.25

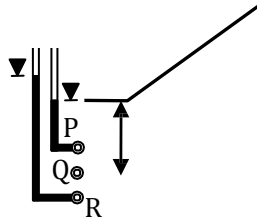
[Ans. A]

37. A layer of normally consolidated, saturated silty clay of 1 m thickness is subjected to one dimensional consolidation under a pressure increment of 20 kPa. The properties of the soil are: specific gravity = 2.7, natural moisture content = 45%, compression index = 0.45, and recompression index = 0.05. The initial average effective stress within the layer is 100 kPa. Assuming Terzaghi's theory to be applicable, the primary consolidation settlement (rounded off to the nearest mm) is

- (A) 2 mm (C) 14 mm
(B) 9 mm (D) 16 mm

[Ans. D]

38. Steady state seepage is taking place through a soil element at Q, 2 m below the ground surface immediately downstream of the toe of an earthen dam as shown in the sketch. The water level in a piezometer installed at P, 500 mm above Q, is at the ground surface. The water level in a piezometer installed at R, 500 mm below Q, is 100 mm above the ground surface. The bulk saturated unit weight of the soil is 18 kN/m^3 and the unit weight of water is 9.81 kN/m^3 . The vertical effective stress (in kPa) at Q is



- (A) 14.42 (C) 16.38
(B) 15.89 (D) 18.34

[Ans. B]

39. The top width and the depth of flow in a triangular channel were measured as 4m and 1m, respectively. The measured velocities on the centre line at the water surface, 0.2m and 0.8m below the surface are 0.7 m/s, 0.6 m/s and 0.4m/s, respectively. Using two - point method of velocity measurement, the discharge (in m^3/s) in the channel is

- (A) 1.4 (C) 1.0
(B) 1.2 (D) 0.8

[Ans. C]

40. Group I contains parameters and Group II lists methods/ instruments.

Group I

- P. Stream flow velocity
Q. Evapo - transpiration rate
R. Infiltration rate
S. Wind velocity

Group II

1. Anemometer
2. Penman's method
3. Hortons's method
4. Current meter

The correct match of Group I & Group II is

- (A) P-1, Q-2, R-3, S-4 (C) P-4, Q-2, R-3, S-1
(B) P-4, Q-3, R-2, S-1 (D) P-1, Q-3, R-2, S-4

[Ans. C]

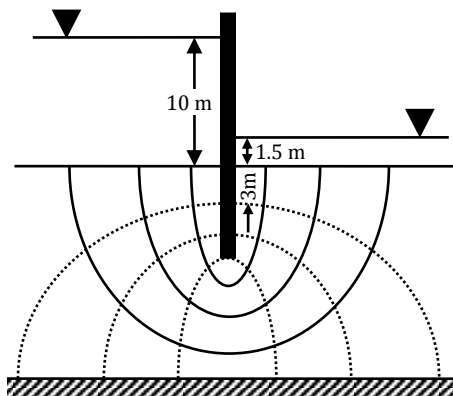
41. Wheat crop requires 55 cm of water during 120 days of base period. The total rainfall during this period is 100 mm. Assume the irrigation efficiency to be 60%. The area (in ha) of the land which can be irrigated with a canal flow of $0.01 \text{ m}^3/\text{s}$ is
(A) 13.82 (C) 23.04
(B) 18.85 (D) 230.40
[Ans. A]
42. A water sample has a pH of 9.25. The concentration of hydroxyl ions in the water sample is
(A) $10^{-9.25}$ moles/L (B) 0.302 mg/L
(C) $10^{-4.75}$ moles/L (D) 3.020 mg/L
[Ans. C]
43. A town is required to treat $4.2 \text{ m}^3/\text{min}$ of raw water for daily domestic supply. Flocculating particles are to be produced by chemical coagulation. A column analysis indicated that an overflow rate of 0.2 mm/s will produce satisfactory particle removal in a settling basin at a depth of 3.5 m. The required surface area (in m^2) for settling is
(A) 210 (C) 1728
(B) 350 (D) 21000
[Ans. B]
44. A pavement designer has arrived at design traffic of 100 million standard axles for a newly developing national highway as per IRC: 37 guidelines using the following data: life = 15 years, commercial vehicle count before pavement construction = 4500 vehicles/day, annual traffic growth rate = 8%. The vehicle damage factor used in the calculation was
(A) 1.53 (C) 3.66
(B) 2.24 (D) 4.14
[Ans. B]
45. The following data are related to a horizontal curved portion of a two-lane highway: length of curve = 200 m, radius of curve = 300 m and width of pavement = 7.5 m. In order to provide a stopping sight distance (SSD) of 80 m, the setback distance (in m) required from the centre line of the inner lane of the pavement is
(A) 2.54 m (C) 7.10 m
(B) 4.55 m (D) 7.96 m
[Ans. B]
46. A two-lane urban road with one-way traffic has a maximum capacity of 1800 vehicle/ hour. Under the jam condition, the average length occupied by the vehicles is 5.0 m. The speed versus density relationship is linear. For a traffic volume of 1000 vehicles/hour, the density (in vehicles / km) is
(A) 70 (C) 71.11
(B) 69.10 (D) 75
[Ans. C]

47. The horizontal distance between two stations P and Q is 100 m. The vertical angles from P and Q to the top of a vertical tower at T are 3° and 5° above horizontal, respectively. The vertical angles from P and Q to the base of the tower are 0.1° and 0.5° below horizontal, respectively. Stations P, Q and the tower are in the same vertical plane with P and Q being on the same side of T. neglecting earth's curvature and atmospheric refraction, the height (in m) of the tower is
- (A) 6.972 (C) 12.540
(B) 12.387 (D) 128.745

[Ans. A]

Common Data Questions 48 and 49

The flow net around a sheet pile wall is shown in the sketch. The properties of the soil are: permeability coefficient = 0.09 m/day (isotropic), specific gravity = 2.70 and void ratio = 0.85. The sheet pile wall and the bottom of the soil are impermeable.



48. The seepage loss (in m^3 per day per unit length of the wall) of water is
- (A) 0.33 (B) 0.38 (C) 0.43 (D) 0.54

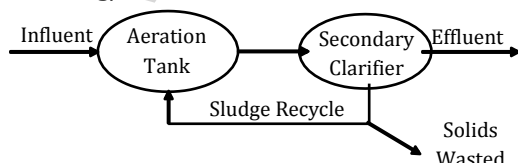
[Ans. B]

49. The factor of safety against the occurrence of piping failure is
- (A) 3.55 (B) 2.93 (C) 2.60 (D) 0.39

[Ans. C]

Common Data Question 50 and 51

An activated sludge system (sketched below) is operating at equilibrium with the following information. Wastewater related data: Flow rate = $500 \text{ m}^3/\text{hour}$, Influent BOD = 150 mg/L, Effluent BOD = 10 mg/L. Aeration tank related data: Hydraulic retention time = 8 hours, mean-cell-residence time = 240 hours, volume = 4000 m^3 , mixed liquor suspended solids = 2000 mg/L.



50. The food-to-biomass (F/M) ratio (in kg BOD per kg biomass per day) for the aeration tank is
- (A) 0.015 (C) 0.225
(B) 0.210 (D) 0.240

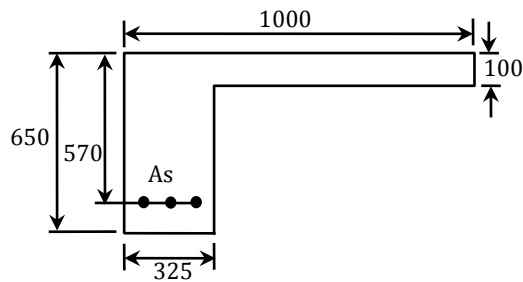
[Ans. C]

51. The mass (in kg/day) of solids wasted from the system is
 (A) 24000 (C) 800
 (B) 1000 (D) 33

[Ans. C]

Statement for Linked Answer Questions 52 and 53

The cross – section at mid – span of a beam at the edge of a slab is shown in the sketch. A portion of the slab is considered as the effective flange width for the beam. The grades of concrete and reinforcing steel are M25 and Fe415, respectively. The total area of reinforcing bars (A), is 4000mm^2 . At the ultimate limit state, x_u denotes the depth of the neutral axis from the top fiber. Treat the section as under – reinforce and flanged ($x_u > 100\text{ mm}$).



All dimensions are in mm.

52. The value of x_u (in mm) computed as per the Limit State Method of IS 456:2000 is
 (A) 200.0 (C) 236.3
 (B) 223.3 (D) 273.6

[Ans. C]

53. The ultimate moment capacity (in kNm) of section, as per the Limit State Method is IS 456:2000 is
 (A) 475.2 (C) 756.4
 (B) 717.0 (D) 762.5

[Ans. B]

Statement for Linked Answer Q. No. 54 & 55

The drainage area of a watershed is 50 km^2 . The ϕ index is 0.5 cm/hour and the base flow at the outlet is $10\text{ m}^3/\text{s}$. One hour unit hydrograph (unit depth = 1 cm) of the watershed is triangular in shape with a time base of 15 hours. The peak ordinate occurs at 5 hours.

54. The peak ordinate (in $\text{m}^3/\text{s}/\text{cm}$) of the unit hydrograph is
 (A) 10.00 (C) 37.03
 (B) 18.52 (D) 185.20

[Ans. B]

55. For a storm of depth of 5.5 cm and duration of 1 hour, the peak ordinate (in m^3/s) of the hydrograph is
 (A) 55.00 (C) 92.60
 (B) 82.60 (D) 102.60

[Ans. D]

General Aptitude (GA) Questions

Q. 56 – Q. 60 carries one mark each.

56. Choose the most appropriate alternative from the options given below to complete the following sentence:

Despite several _____ the mission succeeded in its attempt to resolve the conflict.

- (A) attempts (C) meetings
(B) setbacks (D) delegations

[Ans. B]

57. The cost function for a product in a firm is given by $5q^2$, where q is the amount of production. The firm can sell the product at a market price of ₹ 50 per unit. The number of units to be produced by the firm such that the profit is maximized is

- (A) 5 (C) 15
(B) 10 (D) 25

[Ans. C]

58. Choose the most appropriate alternative from the options given below to complete the following sentence:

Suresh's dog is the one _____ was hurt in the stampede.

- (A) That (C) who
(B) which (D) whom

[Ans. B]

59. Choose the grammatically **INCORRECT** sentence:

- (A) They gave us the money back less the service charges of Three Hundred rupees.
(B) This country's expenditure is not less than that of Bangladesh.
(C) The committee initially asked for a funding of Fifty Lakh rupees, but later settled for a lesser sum.
(D) This country's expenditure on educational reforms is very less.

[Ans. A]

60. Which one of the following options is the closest in meaning to the word given below?

Mitigate

- (A) Diminish (C) Dedicate
(B) Divulge (D) Denote

[Ans. A]

Q. 61 - Q. 65 carry two marks each.

61. A political party orders an arch for the entrance to the ground in which the annual convention is being held. The profile of the arch follows the equation $y = 2x - 0.1x^2$ where y is the height of the arch in meters. The maximum possible height of the arch is

- (A) 8 meters (C) 12 meters
(B) 10 meters (D) 14 meters

[Ans. B]

62. Wanted Temporary, Part-time persons for the post of Field Interviewer to conduct personal interviews to collect and collate economic data. Requirements: High School-pass, must be available for Day, Evening and Saturday work. Transportation paid, expenses reimbursed. Which one of the following is the best inference from the above advertisement?
- (A) Gender-discriminatory (C) Not designed to make the post attractive
(B) Xenophobic (D) Not gender-discriminatory

[Ans. D]

63. Given the sequence of terms, AD CG FK JP, the next term is
- (A) OV (C) PV
(B) OW (D) PW

[Ans. D]

64. Which of the following assertions are **CORRECT**?
- P: Adding 7 to each entry in a list adds 7 to the mean of the list
Q: Adding 7 to each entry in a list adds 7 to the standard deviation of the list
R: Doubling each entry in a list doubles the mean of the list
S: Doubling each entry in a list leaves the standard deviation of the list unchanged
- (A) P, Q (C) P, R
(B) Q, R (D) R, S

[Ans. C]

65. An automobile plant contracted to buy shock absorbers from two suppliers X and Y. X supplies 60% and Y supplies 40% of the shock absorbers. All shock absorbers are subjected to a quality test. The ones that pass the quality test are considered reliable. Of X's shock absorbers, 96% are reliable. Of Y's shock absorbers, 72% are reliable. The probability that a randomly chosen shock absorber, which is found to be reliable, is made by Y is
- (A) 0.288 (C) 0.667
(B) 0.334 (D) 0.720

[Ans. B]