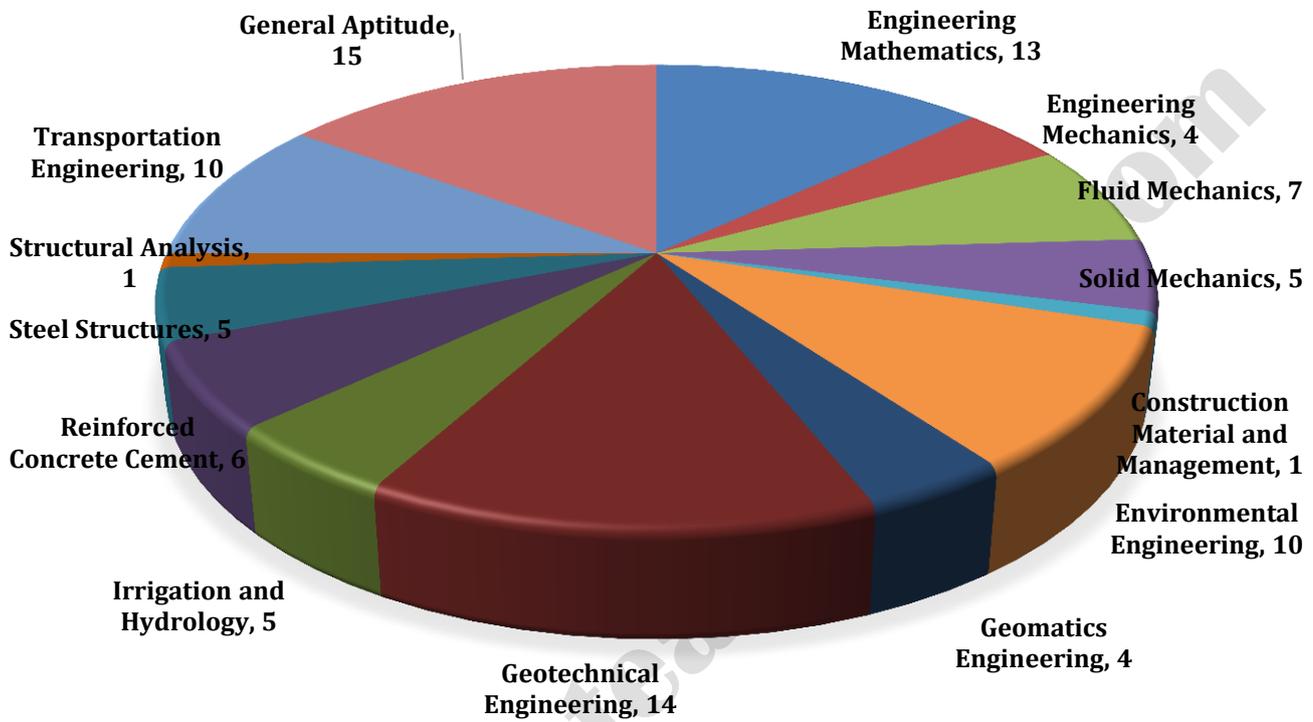


ANALYSIS OF GATE 2018* (Memory Based)

Civil Engineering



CE ANALYSIS-2018_11-Feb_Afternoon

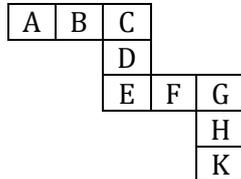
SUBJECT	No. of Ques.	Topics Asked in Paper(Memory Based)	Level of Ques.	Total Marks
Engineering Mathematics	1 Marks: 5 2 Marks: 4	Eigen Vector; Statistics	Tough	13
Engineering Mechanics	1 Marks: 0 2 Marks: 2	Trusses and Frames	Medium	4
Fluid Mechanics	1 Marks: 1 2 Marks: 3	Boundary Layer; Energy Depth Relationship; Discharge calculation	Tough	7
Solid Mechanics	1 Marks: 1 2 Marks: 2	Simple Stress and Strain; Shear Force and Bending Moment; Stresses in Beams Deflection of Beams;	Medium	5
Construction Material and Management	1 Marks:1 2 Marks: 0	Building Materials	Medium	1
Environmental Engineering	1 Marks: 2 2 Marks: 4	Flocculation; BOD; Chemical Characteristics	Medium	10
Geomatics Engineering	1 Marks: 0 2 Marks: 2	Theodolite and Traversing; Leveling;	Easy	4
Geotechnical Engineering	1 Marks: 4 2 Marks: 5	Compression Index; Active Earth Pressure, Permeability	Medium	14
Irrigation and Hydrology	1 Marks: 3 2 Marks: 1	Direct Run-Off (DRH); Ground Water Technology; Delta and Duty; Occurrence of sludge	Medium/Easy	5
Reinforced Cement Concrete	1 Marks: 2 2 Marks: 2	Single Reinforced Beams	Medium	6
Steel Structures	1 Marks: 1 2 Marks: 2	Welding Connection & Plastic Analysis	Medium	5
Structural Analysis	1 Marks: 1 2 Marks: 0	Slope And Deflection Of Structure	Medium	1
Transportation Engineering	1 Marks: 4 2 Marks: 3	Overtaking; Sight Distance	Medium/Easy	10
General Aptitude	1 Marks: 5 2 Marks: 5	Clocks, Proportion, Vocabulary, Combinations, Logarithms and Equations	Tough	15
Total	65			100
Faculty Feedback	Majority of the question were concept based. General Aptitude And Mathematics is Very Easy. Core Subject Questions were 50% easy, 30% medium and 20% tough.			

GATE 2018 Examination***Civil Engineering****Test Date: 11-Feb-2018****Test Time: 2:00 PM 5 :00 PM****Subject Name: Civil Engineering****General Aptitude****Q.1 - Q.5 Carry One Mark each.**

1. A three member committee has to be formed from a group of 9 people. How many such distinct committees can be formed?
(A) 27 (B) 72
(C) 81 (D) 84
[Ans. D]
2. Although it does contain some pioneering ideas, one would hardly characterize the work as _____. The word that fits best in the above sentences.
(A) Innovative (B) Simple
(C) Dull (D) Boring
[Ans. A]
3. His face _____ with joy when the solution of the puzzle was _____ to him.
(A) Shone, Shown (B) Shone, Shone
(C) Shown, Shone (D) Shown, Shown
[Ans. A]
4. For non-negative integer a, b, c, what would be the value of $a + b + c$, if $\log a + \log b + \log c = 0$?
(A) 3 (B) 1
(C) 0 (D) -1
[Ans. A]
5. $(a + a + a + \dots + a)_{n \text{ times}} = a^2b$ and $(b + b + b + \dots + b)_{m \text{ times}} = ab^2$, where a, b, n and m are natural numbers.
What is the value of $(m + m + \dots + m)_{n \text{ times}} \times (n + n + \dots + n)_{m \text{ times}}$?
(A) $2 a^2b^2$ (B) a^4b^4
(C) $ab(a + b)$ (D) $a^2 + b^2$
[Ans. B]

Q.6 - Q.10 Carry Two Mark each.

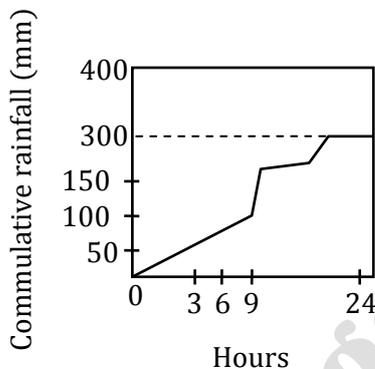
6. Each of the letters in the figure below represents a unique integer from 1 to 9. The letters are positioned in the figure such that each of $(A + B + C)$, $(C + D + E)$, $(E + F + G)$ and $(G + H + K)$ is equal to 13. Which integer does E represent?



- (A) 1 (B) 4
(C) 6 (D) 7

[Ans. B]

7. The annual average rainfall in a tropical city is 1000 mm. On a particular rainy day (24 hours period), the cumulative rainfall experienced in the city is shown in the graph. Over the 24 hours period, 50% of the rainfall falling on a roof top, which had an obstruction free area of 50 m^2 , was harvested into a tank. What is the total volume of water collected in the tank in liters?



- (A) 25000 (B) 18750
(C) 7500 (D) 3125

[Ans. C]

8. Given that $\frac{\log P}{y-z} = \frac{\log Q}{z-x} = \frac{\log R}{x-y} = 10$ for $x \neq y \neq z$, what is the value of the product PQR?

- (A) 0 (B) 1
(C) xyz (D) 10^{xyz}

[Ans. B]

9. In manufacturing industries, loss is usually taken to be proportional to the square of the deviation from a target. If the loss is Rs. 4900 for a deviation is 7 units. What would be the loss in Rs. for a deviation of 4 units from the target?

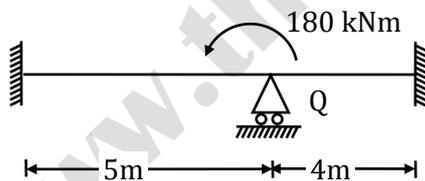
- (A) 400 (B) 1200
(C) 1600 (D) 2800

[Ans. C]

10. A faulty wall clock is known to gain 15 min every 24 hours. It is synchronized to the correct time at 9 AM on 11th July. What will be the correct time to the nearest min when the clock shows 2 PM on 15th July of the same year?
- (A) 12:45 PM (B) 12:58 PM
(C) 1:00 PM (D) 2:00 PM
- [Ans. B]**

Technical

1. A rein forced-concrete slop with effective depth of 80mm is simply supported at two opposite end on 230 mm thick masonry walls. The center-center distance between the walls is 33m. As per IS 45612000 the effective span of the slab (in m, up to two decimal places) is _____
- [Ans. *] will update soon**
2. As per IS 456:2000, the minimum percentage of tension reinforcement (up to two decimal places) required in reinforced concrete beam of rectangular c/s (Considering effective depth in the calculation of area) using Fee 500 grade steel is _____
- [Ans. *] will update soon**
3. A flocculation tank contain 1800m³ of water which is mired using paddle at an average velocity gradient G of 100/s .The water temperature and the corresponding dynamic viscosity are 30°C and 0.798×10^{-3} Ns/m² respectively. The theoretical power required to achieve the stated value of G (in Kw, up to two decimal place) is _____
- [Ans. *] will update soon**
4. A prismatic beam P-Q-R of flexural rigidity $EI = 1 \times 10^4$ kNm² is subjected to a moment of 180 kNm at Q as shown in figure. The rotation in Q (in rad, up to two decimal places) is _____



[Ans. 0.01]

5. In a 5m wide rectangular. Channel the velocity U distribution in the vertical direction y is given by $U = 1.25 y^{\frac{1}{6}}$. The distance y is measured from the channel bed. If the flow depth is 2m, the discharge per unit width of the channel is
- (A) 2.40 m³/s/m (B) 2.80 m³/s/m
(C) 3.27 m³/s/m (D) 12.02 m³/s/m
- [Ans. B]**

6. The total rainfall in a catchment of area 1000 km^2 during a 6 hours storm is 19 cm. The surface run-off due to this storm computed from triangular direct run off hydrograph is $1 \times 10^8 \text{ m}^3$. The ϕ – index for this storm (in cm/h, up to one decimal place) is

[Ans. *] 1.5

7. As per IS 10500 2012 for drinking water in the absence of alternate sources of water the permissible limits for chloride and sulphate in mg/l respectively are

- (A) 250 and 200 (B) 1000 and 400
(C) 200 and 250 (D) 500 and 1000

[Ans. *] will update soon

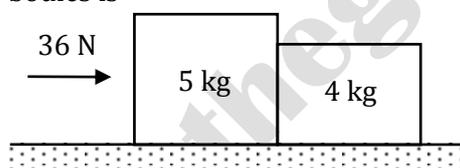
8. At a small water treatment plant which has 4 filters, the rate of filtration and back wasting are $200 \text{ m}^3/\text{day}/\text{m}^2$ and $1000 \text{ m}^3/\text{d}/\text{m}^2$ respectively. Back wasting is done for 15 minutes /day. The malnutrition which occurs initially as the filter is put back into service after cleaning takes 30min. It is proposed to recover the water being wasted during back wasting and maturation. The percentage increase in filtered water produced (up to two decimal place) would be _____

[Ans. *] will update soon

9. The total rainfall in a catchment of area 100 km^2 during a 6 h storm 19 cm. The surface runoff due to this storm computed from triangular DRH is $1 \times 10^8 \text{ m}^3$. The ϕ_{index} for this storm (in cm/h), upto one decimal place) is _____?

[Ans. 1.5 cm/h]

10. Two rigid bodies of mass 5 kg and 4 kg are at rest on a friction less surface until acted upon by a force of 36N as shown in figure. The contact force generated between the two bodies is



- (A) 4 N (B) 7.2 N
(C) 9.0 N (D) 16.0 N

[Ans. D]

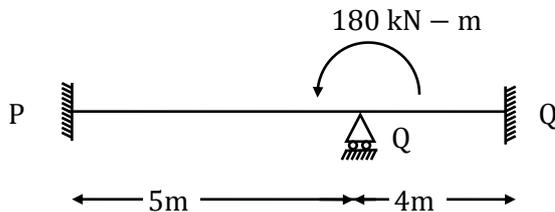
11. A singly reinforced rectangular concrete beam of width 300 mm and effective depth 400 mm is to be designed using M25 grade concrete and Fe 500 grade reinforcing steel for the beam to be under reinforced the maximum number of 16 mm dia reinforcing beam than can be provided is

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

[Ans. D]

12. A Probability (up to 1 decimal place) of consecutively picking 3 red balls without replacement from a bar continuity 5 red balls and 1 white ball is _____
[Ans. *] will update soon
13. The matrix $\begin{bmatrix} 2 & -4 \\ 4 & -2 \end{bmatrix}$ has
(A) Real eigenvalues and Eigen vectors
(B) Real eigenvalues but complex Eigen vectors
(C) Complex eigenvalues but real Eigen vectors
(D) Complex eigenvalues and Eigen vectors
[Ans. *] will update soon
14. A culvert is designed for a flood frequency of 100 years and a useful life of 20 years. The risk involved in the design of the culvert (in percentage up to two decimal place) is _____
[Ans. 0.1820]
15. Dupuits assumption are valid for
(A) artesian aquifer (B) confined
(C) leaky (D) Un confined
[Ans. D]
16. The intensity of irrigation for the kharif season is 50% of for an irrigate project with CCA of 50,000 hec. The duty for the kharif season is 1000 ha/m³ /s. Assuming transmission loss of 10%,the required discharge(In cumec upto two decimal place) at the head of the canal s _____
[Ans. 250]
17. Reinforcement –concrete slab with effective depth of 80 mm is simply supported at two opposite ends on 230 mm thick reasonry walls. The center-center distance between the wall is 33 m .As per is IS 456.2000 the effective span of the slab (in m ,up to two decimal places)is _____
[Ans. *] Will update soon
18. As per IS 456:2000 the minimum percentage of tension of reinforcement (up to two decimals places) required in reinforcement concrete beam of rectangular cross section. Considering effective depth in the calculation of area using Fe 500 grade steel is _____
[Ans. *] Will update soon
19. A flocculation tank contains 1800 m³of water which is mixed using paddles at an average velocity gradient of 100 m/s .The water temperature and the corresponding dynamic viscosity are 30°C and 0.798 × 10⁻³ Ns/m²respectively.The theoretical power required to achieve the stated value of G(in kW, up to two decimal places is)_____
[Ans. *] Will update soon

20. A prismatic beam P-Q-R of flexural rigidity $EI = 1 \times 10^4 \text{ kNm}^2$ is subjected to a moment of 180 kNm at Q as shown in figure. The rotation in Q in rad, up to two decimal places is _____



[Ans. *] 0.01

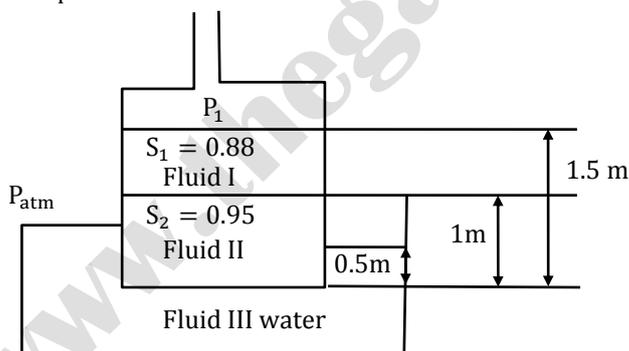
21. At a small water treatment plant which has 4 filters, the rate of filtration and backwashing are $200 \text{ m}^3/\text{d}/\text{m}^2$ and $100 \text{ m}^3/\text{d}/\text{m}^2$ respectively. Backwashing is done for 15 min/day. The maturation which occurs initially as the filter is put back into service after cleaning takes 30 min. It is proposed to recover the water being wasted during backwashing and maturation. The percentage increase in the filtered water produced (up to two decimal places) would be _____

- (A) 250 and 200 (B) 1000 and 400
(C) 200 and 250 (D) 500 and 1000

[Ans. *] Will update soon

22. A three fluid (immiscible) is connected to a vacuum pump. The special gravity values of the fluids (S_1, S_2) are given in figure. The gauge pressure value (in $\frac{\text{kN}}{\text{m}^2}$), upto two decimal places of

Unit weight of water $\gamma_w = 9.81 \text{ kN/m}^3$
 $\text{atm}_{\text{press}} = 45.43 \text{ kPa}$



[Ans. *] Will update soon

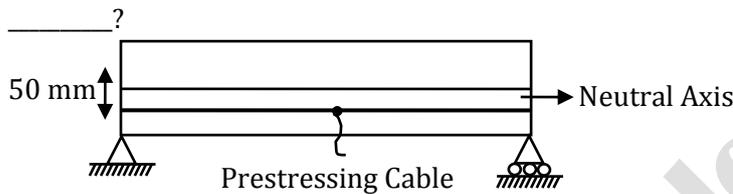
23. A coal containing 2% sulphur is burned completely to ash in a brick kiln at a rate of 30 kg/min. The sulphur content in the ash was found to be 8% of the initial amount of sulphur present in the coal field to the brick kiln. The molecular weight of S, H and o are 32, 1 and 16 g/mo/wt. The annual rate of sulphurdioxide (SO_2) emission from the kiln (in tonnes/gear) up to two decimal places is _____?

[Ans. *] Will update soon

24. A rough pipe of 0.5 m diameter, 300 m length and roughness height of 0.25 mm carries water (kinematic viscosity = $0.9 \times 10^{-6} \text{m}^2/\text{s}$) with a velocity of 8 m/s. Friction factor (f) for laminar flow is given by $f = 64/\text{Re}$ and for turbulent flow it is given by $\frac{1}{\sqrt{f}} = 2 \log_{10} \left(\frac{r}{k} \right) + 1.74$ where, Re is Reynold's number
 $R = \text{Radius of pipe}$
 $k = \text{Roughness height}$
 $g = 9.81 \text{ m/s}^2$
 The head loss (up to two decimal places) in the pipe due to friction is _____?

[Ans. *] Will update soon

25. A 6 m long simply supported beam is Pre-stressed as shown in the figure. The beam carries a UDL of 6 kN/m over its entire span. If $EI = 2 \times 10^4 \text{ kN/m}^2$ and the effective Prestressing force is 200 kN, the net increase in length of Prestressing cable (in mm up to two decimal places) is _____?



[Ans. *] Will update soon

More Questions Update Soon