



GATE 2021 Examination* (Memory Based)

Civil Engineering

Test Date: 6th Feb-2021

Test Time: 09:30 am to 12:30 pm

Stream Name: Civil Engineering

General Aptitude

1. Let \oplus and \odot are two operators on p and q

$$p \oplus q = \frac{p^2 + q^2}{pq} \text{ and } p \odot q = \frac{p^2}{q}$$

If $x \oplus y = 2 \odot 2$, then x will be equal to

- (A) 2y
 (B) y/2
 (C) 3y/2
 (D) y

[Ans. D]

2. Getting to the top is _____ than staying on top.

- (A) easier
 (B) more easier
 (C) easiest
 (D) much easier

[Ans. A]

3. Two papers M and N have identical dimension of 6m * 4m.

Operation 1: Folded the paper joining the short sides

Operation 2: Folded the paper joining the longer sides.

If operation 1 is done on paper M and operation 2 is done on paper N, then the ratio of perimeter of paper N to M is

- (A) 5:13
 (B) 3:2
 (C) 7:5
 (D) 13:7

[Ans. D]

4. Humans have the ability to construct worlds entirely in their mind, which does not exist in the physical world. So far as we know, no other species possess this. This skill is so important that we have different words to refer to its different flavors such as imagination invention and innovation.

With respect to the above, which of the following is correct?

- (A) Ima, invention, and innovation are unrelated to the ability to construct mental world
 (B) We do not know any species than humans who possess ability to construct mental world
 (C) Ima..., Invention..., and innovation refers to unrelated skills
 (D) No species possess ability to construct mental world.

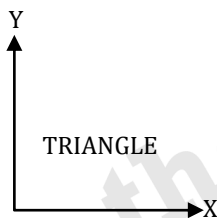
[Ans. *]

5. Let $\lambda(p, q) = \begin{cases} (p - q)^2 & \text{if } p \geq q \\ p + q & \text{if } p < q \end{cases}$
 Then $\frac{\lambda(-(-3 + 2), (-2 + 3))}{(-(-2 + 1))}$ will be

- (A) 16/3
 (B) 16
 (C) 0
 (D) -1

[Ans. *]

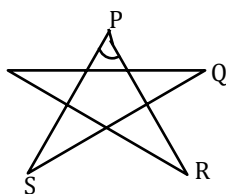
6. What will be the mirror image of the following word if mirror is kept among along x-axis?



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

[Ans. *]

7. Following shape is forward by S equal length segments PR, PS, TQ, TR, and QS. what will be the angle θ ?



[Ans. *]36



8. In a company ,35% employees drink coffee, 40%. Drink tea and 10% .drink both tea and coffee .Then how much percentage of employees will neither drink coffee nor tea ?
- (A) 40%
(B) 15%
(C) 25%
(D) 35%
- [Ans. D]**
9. For persons P, Q, R, S are to be seated in a row facing same direction. P and R cannot be seated adjacent .S should be seated right of Q. Then how many distinct seating arrangements is possible?
- (A) 6
(B) 8
(C) 2
(D) 4
- [Ans. A]**
10. A

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Technical

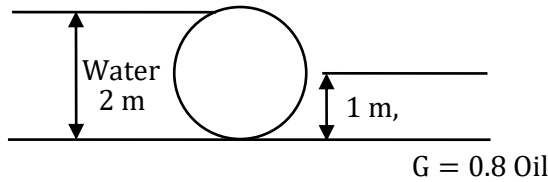


1. $\lim_{x \rightarrow 1} \left(\frac{1}{\ln(x)} - \frac{1}{x-1} \right)$
[Ans. *]

2. $\begin{bmatrix} 1 & 2 & 2 & 3 \\ 3 & 4 & 2 & 5 \\ 5 & 6 & 2 & 7 \\ 7 & 8 & 2 & 9 \end{bmatrix}_{4 \times 4} \begin{bmatrix} 2 & 4 \\ 1 & 3 \end{bmatrix}$
[Ans. *]

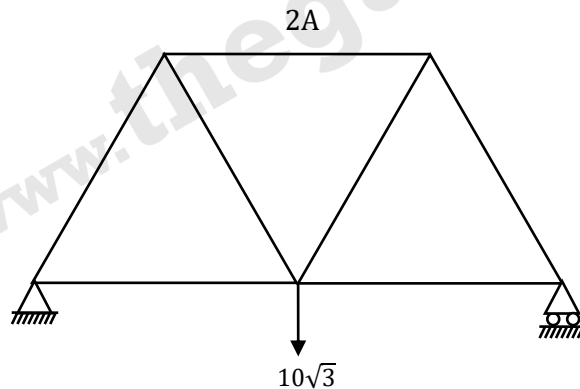
3. Given differential equation
 $\frac{d^2Y}{dx^2} + \frac{2dy}{dx} + y = 0$
and $y(0) = 1, y(1) = 3$ find y_c

4. Calculate the ratio of vertical force by horizontal force?



[Ans. *]
 $F_V = 1.374$

5. What is the compressive stress in upper member?



[Ans. *]

6. A The most preferred curve for vertical alignment is



- (A) Circle
 - (B) Spiral
 - (C) Parabola
 - (D) Elliptical
- [Ans. *]

7. Spot speed 40, 55, 60, 65 and 80 km/hr, calculate space mean speed?
8. Total time loss as given as 3 second per phase. Number of phases are two determine the optimum cycle length if Y_1 and Y_2 are given as 0.47 and 0.3 respectively.
9. $V = 70(1 - 0.7)$ determine the time head way maximum traffic volume.
10. At an intersection, vehicle arrival follows poisson distribution. The mean vehicle arrival is 2 veh/minute. What will be the probability that at least two vehicles will be arriving at the intersection?
11. A two-phase signal is designed at an intersection with average delay of 3 seconds per phase. If the ratio of normal flow and saturation flow are 0.37 and 0.4 for the phases. The optimum cycle time will be?
12. Shape of most common highway vertical curve is
- (A) Circular with single radius
 - (B) Circular with multi radius
 - (C) Spiral
 - (D) Parabola
13. Design speed of a road is 80 KMPH. It has a horizontal curve of 250 m radius. If lateral friction is assumed to be developed, the required super elevation will be?
- (A) 0.02
 - (B) 0.09
 - (C) 0.07
 - (D) 0.05

14. Speed and density on a highway stretch is found to be obeying the relationship $V = 70 - 0.7k$ (where V is the KMPH & k in veh/km) At capacity condition, the time mean speed will



- (A) 0.5
 (B) 1.6
 (C) 1
 (D) 2.1

15. Following data is observed on a ground where runway is to be constricted

Length	Gradient
0 to 300m	1.2%
300 to 600m	-0.7%
600 to 1100	0.6%
1100 to 1400	0.8%
1400 to 1700	-1.0%

Effective gradient will be ?(in%, row 1 decimal)

Coming Soon

16. A
 17. A
 18. A
 19. A
 20. A
 21. A
 22. A
 23. A
 24. A
 25. A
 26. A

Refer & Win

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27. A



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