BYJU'S EXAM PREP

GATE 2021

Mechanical Engineering

General Aptitude (Question with Solution Set-1 & 2)

SET-1

1. Consider the following sentences:

(i) After his surgery. Raja hardly could walk.

(ii) After his surgery. Raja could barely walk.

(iii) After his surgery. Raja barely could walk.

(iv) After his surgery. Raja could hardly walk.

Which of the above sentences are grammatically CORRECT?

A. (iii) and (iv) B. (i) and (ii)

C. (i) and (iii) D. (ii) and (iv)

Ans. D

Sol. **Hardly/barely** is an adverb that means "almost none".

Hardly/barely used, especially after 'can' and 'could' and before the main verb to emphasize that something is difficult to do:

So, After his surgery, Raja **could** hardly / barely **walk, which** is grammatically correct.

Hence sentence (ii) and (iv) is correct

Correct option: D

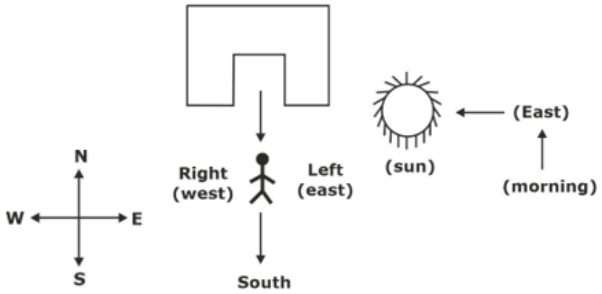
2. Ms. X came out of the building through its front door to find her shadow due to the morning sun falling to her right side with the building to her back. From this, it can be inferred that building is facing _____

A. East B. West

C. South D. North

Ans. C

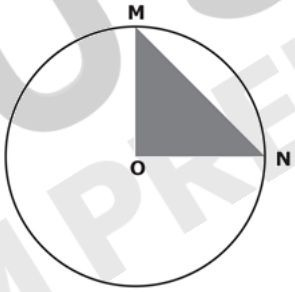
Sol. Since its shadow is falling to her right in the morning means the sun will be in his left i.e. east will be in his left hand thus building must be south facing.



3. In the given figure. O is the center of the circle and, M and N lie on the circle.

The area of the right triangle MON is 50 cm^2.

What is the area of the circle in cm^2?



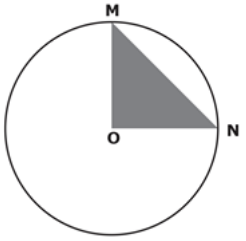
A. 100π B. 75π

C. 50π D. 2π

Ans. A

Sol. Given,

Area of the right triangle MON = 50 cm^2,



From the above diagram we can say that,

MO = NO = radius of the circle (r)

Area of ΔMON = 1/2*(MO)*(NO)= 50 cm^2

$\frac{1}{2}(r) \times (r) = 50$

$r^2 = 100 \Rightarrow r = 10$ cm

So, Area of circle = $\pi r^2 = 100\ \pi\ cm^2$

4. If $\begin{cases} "\oplus" \text{ means } "-", \\ "\otimes" \text{ means } "\div", \\ "\Delta" \text{ means } "+", \\ "\nabla" \text{ means } "\times", \end{cases}$

then, the value of the expression $\Delta\ 2\ \oplus\ 3\ \Delta\ ((4\ \otimes\ 2)\ \nabla\ 4)$ =

A. 7 B. 6

C. −0.5 D. −1

Ans. A

Sol. $\Delta 2 \oplus 3 \Delta ((4 \otimes 2) \nabla 4)$

$+2-3+((4 \div 2) \times 4)$

$+2-3+(2 \times 4) = 7$

5. The increased consumption of leafy vegetables in the recent months is a clear indication that the people in the state have begun to lead a healthy lifestyle"

Which of the following can be logically inferred from the information presented in the above statement?

A. Consumption of leafy vegetables may not be the only indicator of healthy lifestyle.

B. Leading a healthy lifestyle is related to a diet with leafy vegetables.

C. The people in the state did not consume leafy vegetables earlier.

D. The people in the state have increased awareness of healthy hazards causing by consumption of junk foods.

Ans. B

Sol. (A) Consumption of leafy vegetables may not be the only indicator of a healthy lifestyle. It may be true, but from the given passage, it can't be concluded.

(C) The people in the state did not consume leafy vegetables earlier.

It is clearly stated that increased consumption of leafy vegetables in the recent months. It means that there was a consumption of it in the past which got increased in recent month. So, this cannot imply "no consumption" earlier.

(D) The people in the state have increased awareness of health hazards caused by the consumption of junk foods.

There is no mention of the consumption of junk foods in the passage. It can not be the answer.

(B) Leading a healthy lifestyle is related to a diet with leafy vegetables.

It is mentioned that the consumption of leafy vegetables leads to a healthy lifestyle. Hence it is the correct answer.

6. Oxpeckers and rhinos manifest a symbiotic relationship in the wild. The oxpeckers warn the rhinos about approaching poachers, thus possibly saving the lives of the rhinos. Oxpeckers also feed on the parasitic ticks found on rhinos.

In the symbiotic relationship described above, the primary benefits for oxpeckers and rhinos respectively are.

A. Oxpeckers get a food source, rhinos have no benefit.

B. Oxpeckers get a food source, rhinos may be saved from the poachers.

C. Oxpeckers save the lives of poachers, rhinos save their own lives.

D. Oxpeckers save their habitat from poachers while the rhinos have no benefit.

Ans. B

Sol. From the statement, Oxpeckers also feed on the parasitic ticks found on rhinos. We can conclude that **Oxpeckers get a food source**.

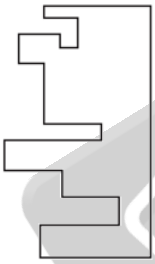
It is mentioned that the oxpeckers warn the rhinos about approaching poachers, thus possibly **saving the lives of the rhinos**.

So, from above, we can say that Oxpeckers get a food source, rhinos may be saved from the poachers. Hence Option B is the right answer.

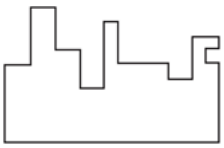
It is stated that by warning about poachers, oxpeckers saves the life of rhinos. This means **rhinos have a benefit from this symbiotic relationship**. Option A and option D is wrong.

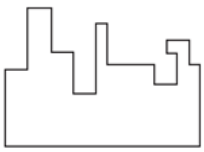
"Rhinos save their own lives" is not mentioned in the statement. Hence option C is wrong.

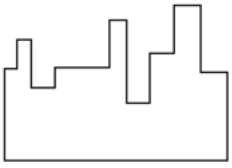
7.

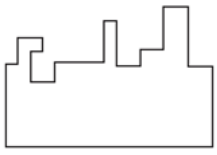


A jigsaw puzzle has 2 pieces. One of the pieces is shown above. Which one of the given options of for the missing piece when assembled will form a rectangle? The piece can be moved, rotated or flipped to assemble with the above piece.

A. 

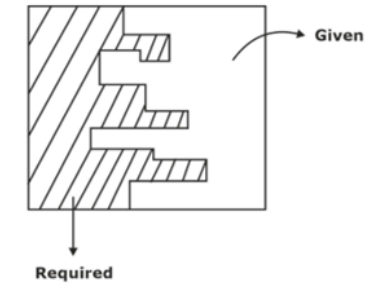
B. 

C. 

D. 

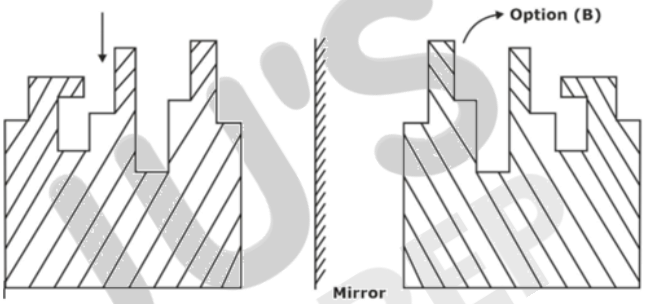
Ans. B

Sol.



Required

After putting it horizontally



8. The number of hens, ducks and goats in farm P are 65, 91 and 169, respectively. The total number of hens, ducks and goats in a nearby farm Q is 416 . The ratio of hens: ducks: goats in farm Q is 5:14:13. All hens, ducks and goats are sent from farm Q to farm P.

The new ratio of hens: ducks: goats in farm P is _____.

A. 21:10:26 B. 5:7:13

C. 10:21:26 D. 5:14:13

Ans. C

Sol. Given,

Farm P:

Hens = 65

Duck = 91

Goat = 169

Farm Q:

Total number of hens, ducks, and goats = 416,

Hens: Duck: Goat = 5 : 14 : 13,

So, 5K + 14K + 13K = 416,

32K = 416

K = 13,

So, Hens = 5K = 65; Duck = 14K = 182; Goats = 13K = 169

After Merging, Total numbers are

Hens = 65 + 65 = 130

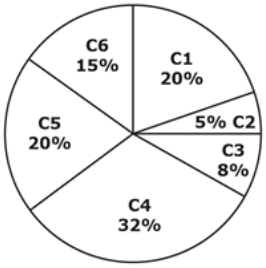
Duck = 91 + 182 = 273

Goat = 169 + 169 = 338

Ratio: Hens : Duck : Goats = 130 : 273 : 338 = 13 × 10 : 13 × 21 : 13 × 26

Ratio: Hens : Duck : Goats = 10 : 21 : 26

9.



Company	Ratio
C1	3:2
C2	1:4
C3	5:3
C4	2:3
C5	9:1
C6	3:4

The distribution of employees at the rank of executives. Across different companies C1, C2, …, C6 is presented in the chart given above. The ration of executives with a management degree to those without a management degree in each of these companies is provided in the table above. The total number of executives across all companies is 10.000.

The total number of management degree holders among the executives in companies C2 and C5 together is_____.

A. 1900 B. 2500

C. 225 D. 600

Ans. A

Sol. Given,

Total number of executives = 10,000

Companies	Percentage distribution	Executives	Ratio with management to without management degree	With management	Without management
C_1	20	2000	3:2	1200	800
C_2	5	500	1:4	100	400
C_3	8	800	5:3	500	300
C_4	32	3200	2:3	1280	1920
C_5	20	2000	9:1	1800	200
C_6	15	1500	3:4	642.85	857.12

Total executives in C_2 & C_5 with management degree = 100 + 1800 = 1900

10. Five persons P, Q, R, S and T are sitting in a row not necessarily in the same order. Q and R are separated by one person, and S should be seated adjacent to Q.

The number of distinct seating arrangements possible is:

A. 8 B. 4

C. 10 D. 16

Ans. D

Sol. There are 8 possible ways of sitting (from the left end)

Q P R S T
Q T R S P
Q T R P S
Q P R T S
P Q T R S
T Q P R S
S P Q T R
S T Q P R

Similar 8 ways of sitting can be done from the right side (Mirror image)

So, there is total 16 possible ways of sitting arrangement.

SET-2

1. Five persons P, Q, R, S and T are to be seated in a row, all facing the same direction but not necessarily in the same order. P and T cannot be seated at either end of the row. P should not be seated adjacent to S.R is to be seated at the second position from the left end of the row. The number of distinct seating arrangements possible is:

A. 4 B. 3

C. 5 D. 2

Ans. B

Sol. The possible arrangements for the seating are given below

$$\begin{matrix} Q & R & P & T & S \\ S & R & T & P & Q \\ S & R & P & T & Q \end{matrix}$$

2. Consider the following sentences:

i) The number of candidates who appear for the GATE examination is staggering.

ii) A number of candidates from my class are appearing for the GATE examination.

iii) The number of candidates who appear who appear for the GATE examination are staggering.

iv) A number of candidates from my class is appearing for the GATE examination.

Which of the above sentences are grammatically CORRECT?

A. (i) and (ii) B. (i) and (iii)

C. (ii) and (iii) D. (ii) and (iv)

Ans. A

Sol. The expression "*the number*" is followed by a singular verb, while "*a number*" is followed by a plural verb.

(i) The number of candidates who appear for the GATE examination is staggering, is grammatically correct.

Also, (ii) A number of candidates from my class are appearing for the GATE examination, is grammatically correct.

Hence, option A is the right answer.

3. A digital watch X beeps every 30 seconds while watch Y beeps every 32 seconds. They beeped together at 10 AM. The immediate next time that they will beep together is _____.

A. 10.00 PM B. 10.08 AM

C. 11.00 AM D. 10.42 AM

Ans. B

Sol. LCM (30, 32) = 2 × 2 × 8 × 3 × 5

= 2 × 16 × 15 = 480

480 sec = 8 min

Show the time is 10: 08 AM.

4. $If \oplus \div \odot = 2; \oplus \div \Delta = 3; \odot + \Delta = 5; \Delta \times \otimes = 10$.

Then, the value of $(\otimes - \oplus)^2$, is _____.

A. 1 B. 0

C. 16 D. 4

Ans. A

Sol. $If \oplus \div \odot = 2; \oplus \div \Delta = 3; \odot + \Delta = 5; \Delta \times \otimes = 10$

$\oplus \div \odot = 2; \Rightarrow \odot = x \& \oplus = 2x$

$\oplus \div \Delta = 3 \Rightarrow 2x \div \Delta = 3 \Rightarrow \Delta = \frac{2x}{3}$

$\odot + \Delta = 5 \Rightarrow x + \frac{2x}{3} = 5 \Rightarrow x = 3$

$\Delta \times \otimes = 10 \Rightarrow \frac{2x}{3} \times \otimes = 10 \Rightarrow \otimes = 5$

$\odot = x = 3, \oplus = 2x = 6, \Delta = \frac{2x}{3} = 2, \otimes = 5$

$(\otimes - \oplus)^2 = (5 - 6)^2 = 1$

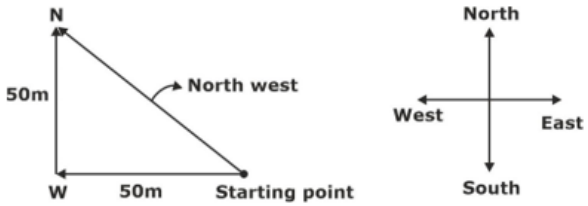
5. The front door of Mr. X's house faces East. Mr. X leaves the house, walking 50 m straight from the back door that is situated directly opposite to the front door. He then turns to his right, walks for another 50 m and stops. The direction of the point Mr. X is now located at with respect to the starting point is _____.

A. South-East B. North-West

C. North-East D. West

Ans. B

Sol.



From the above image, we can say that the direction of point N (Mr. X now) is located in the **North-West** direction with respect to the starting point.

6. Given below are two statement 1 and 2, and two conclusions I and II.

Statement 1: All entrepreneurs are wealthy.

Statement 2: All wealthy are risk seekers.

Conclusion I: All risk seekers are wealthy.

Conclusion II: Only some entrepreneurs are risk seekers.

Based on the above statements and conclusions, which one of the following options is CORRECT?

A. Neither conclusion I nor II is correct

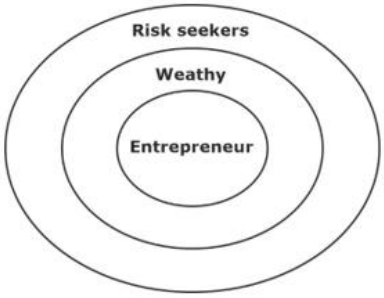
B. Only conclusion II is correct

C. Both conclusions I and II are correct

D. Only conclusion I is correct

Ans. A

Sol. From the given statement, the possible ven diagram is as follows:



From the above Venn diagram, we can say some risk seekers are wealthy not all. So, Conclusion I: All risk seekers are wealthy, is false.

From the above Venn diagram, all entrepreneurs are risk seekers. seekers. So, conclusion II: Only some entrepreneurs are risk seekers, is also false.

Hence, Neither conclusion I nor II is correct

7. A box contains 15 blue balls and 45 black balls. If 2 balls are selected randomly, without replacement, the probability of an outcome in which the first selected is a blue ball and the second selected is a black ball, is _____.

A. $\frac{3}{4}$ B. $\frac{45}{236}$

C. $\frac{3}{16}$ D. $\frac{1}{4}$

Ans. B

Sol. First Blue then Black

$$P = \frac{15C_1}{60C_1} \times \frac{45C_1}{59C_1} = \frac{15}{60} \times \frac{45}{59} = \frac{45}{236}$$

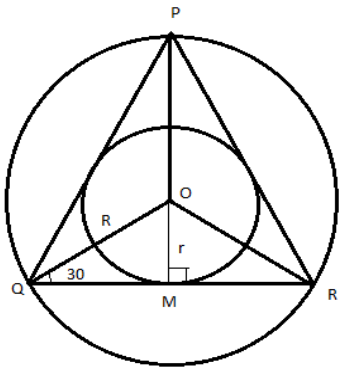
8. The ratio of the area of the inscribed circle to the area of the circumscribed circle of an equilateral triangle is _____.

A. $\frac{1}{6}$ B. $\frac{1}{2}$

C. $\frac{1}{8}$ D. $\frac{1}{4}$

Ans. D

Sol. Let R be the radius of circumscribed circle and r be the radius of the inscribed circle.



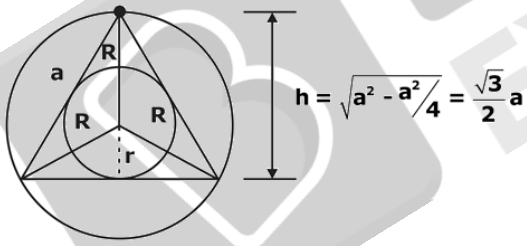
We know that the line joining the incentre and vertices of an equilateral triangle is angle bisector. so, angle MQO=30 degree
In triangle OMQ

$$\sin \angle OQM = \frac{OM}{OQ} = \frac{r}{R}$$

$$\sin 30° = \frac{r}{R} \Rightarrow \frac{r}{R} = \frac{1}{2}$$

Hence, $\frac{\text{area of inner circle}}{\text{area of outer circle}} = \frac{\pi r^2}{\pi R^2} = \frac{r^2}{R^2} = \frac{1}{4}$

ALTERNATE



$$R + r = h = \frac{\sqrt{3}}{2}a$$

$$r^2 + \frac{a^2}{4} = R^2$$

$$\left(\frac{\sqrt{3}}{2}a - R\right)^2 + \frac{a^2}{4} = R^2$$

$$\frac{3}{4}a^2 + R^2 - \sqrt{3}\,a\,R + \frac{a^2}{4} = R^2$$

$$a^2 = \sqrt{3}\,aR$$

$$a = \sqrt{3}\,R$$

$$R = \frac{1}{\sqrt{3}}a$$

$$r = \frac{\sqrt{3}}{2}a - \frac{1}{\sqrt{3}}a = \frac{a}{2\sqrt{3}}$$

$$\frac{A_{inner}}{A_{outer}} = \frac{\pi r^2}{\pi R^2} = \frac{\frac{a^2}{12}}{\frac{a^2}{3}} = \frac{3}{12} = \frac{1}{4}$$

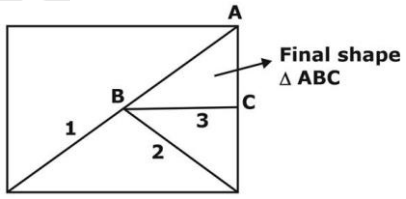
9. Consider a square sheet of side 1 unit. The sheet is first folded along the main diagonal. This is followed by a fold along its line of symmetry. The resulting folded shape is again folded along its line of symmetry. The area of each face of the final folded shape, in square units equal to _____.

A. $\frac{1}{4}$ B. $\frac{1}{16}$

C. $\frac{1}{32}$ D. $\frac{1}{8}$

Ans. D

Sol. The initial area of the square = 1



The final area will be the 1/8th part of the initial area; thus Answer will be D.

Alternate:

- let suppose the area of square Initially =1
- Folded first time, then the area of folded part =1/2
- Folded second time, then the area of folded part =1/4
- Folded third time, then the area of final folded shape =1/8

Hence the final area will be the 1/8th part of the initial area; thus Answer will be D.

10. The world is going through the worst pandemic in the past hundred years. The air travel industry is facing a crisis, as the resulting quarantine requirement for travellers led to weak demand.

In relation to the first sentence above, what does the second sentence do?

A. Restates an idea from the first sentence.
B. Second sentence entirely contradicts the first sentence.
C. The two statements are unrelated.
D. States an effect of the first sentence

Ans. D

Sol. Option A is wrong because the second sentence doesn't restate the first sentence.

Option B is wrong because second sentence doesn't contradict the first one, because second sentence is the effect and the first one is the reason.

Option C is wrong because both statement is related second sentence is the effect and the first one is the reason.

Hence option D is correct that second sentence is the effect of first one.

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