BYJU'S EXAM PREP

GATE 2018

Mechanical Engineering

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

SET-1

1. Going by the _____ that many hands make light work, the school _____ involved all the students in the task." The words that best fill the blanks in the above sentence are

A. principle, principal
B. principal, principle
C. principle, principle
D. principal, principal

Ans. A

Sol. Principle – the fundamental rule that serves as the foundation of a person's belief.
Principal – The most important person in an organization. Here it refers to the school Principal.
"Going by the **principle** that many hands make light work, the school **principal** involved all the students in the task." So, A is the correct answer.

2. "Her _____ should not be confused with miserliness, she is ever willing to assist those in need."
The word that best fills the bank in the above sentence is:

A. Cleanliness B. punctuality
C. frugality D. greatness

Ans. C

Sol. The statement suggests that some weak condition of the person is depicted. And this weak condition should not be taken as being miser.
Miser: A person reluctant to spend.
Frugal: A person who is economically weak.

3. Seven machines take 7 minutes to make 7 identical toys. At the same rate, how many minutes would it take for 100 machines to make 100 toys?

A. 1 B. 7
C. 100 D. 700

Ans. B

Sol. Time taken by a machine to make a toy will be independent of how many machines are making toys in parallel.
From given data, it takes 7 minutes for a machine to make a toy. If hundred such machines are running parallel to make a toy each, the time will remain same 7 minutes.
7 machine → 7 toys → 7 minutes
1 machine → 1 toy → 7 minutes
Because one machine takes 7 minute for making 1 toy.
So, 100 machines will take 7 minute for making 100 toys.

4. A rectangle becomes a square when its length and breadth are reduced by 10 m and 5 m, respectively. During this process, the rectangle loses 650 m^2. What is the area of the original rectangle in square meters?

A. 1125 B. 2250
C. 2924 D. 4500

Ans. B

Sol. Let 'a' be the side of square, then length and breadth of rectangle are 'a + 10 and 'a + 5' respectively.
Given that,
Area of rectangle = Area of Square + 650
$(a + 10)(a + 5) = a^2 + 650$

$a^2 + 15a + 50 = a^2 + 650$

$15a = 600$

$a = 40$

Area of rectangle = $a^2 + 650$

Area of rectangle = 1600 + 650 = 2250

5. A number consists of two digits. The sum of the digits is 9. If 45 is subtracted from the number. Its digits are interchanged. What is the number?

A. 63 B. 72

C. 81 D. 90

Ans. B

Sol. Let unit place digit is y and ten's place digit is x.

Hence the number becomes '10x +y' and the reverse number will be '10y + x'

$x + y = 9$ …(i)

$10x + y - 10y - x = 45$

$x - y = 5$ …(ii)

Adding (i) and (ii)

$x = 7$

Subtracting (i) and (ii)

$y = 2$

Therefore the number is 72.

6. For integers a, b and c, what would be the minimum and maximum values respectively of a + b + c if

A. –3 and 3 B. –1 and 1

C. –1 and 3 D. 1 and 3

Ans. A

Sol. $\log |a| + \log |b| + \log |c| = 0$

It is possible only,

If |a|, |b| and |c| all are equal to 1.

So, a, b, c may be respectively '+1' or '–1'.

For minimum value all three will be negative.

So, minimum value = –3

For maximum value all three will be positive.

So, maximum value = + 3.

7. Given that a and b are integers and $a + a^2b^3$ is odd, which one of the following statements is correct?

A. a and b are both odd

B. a and b are both even

C. a is even and b is odd

D. a is odd and b is even

Ans. D

Sol. Given: a and b are integers

$a + a^2b^3$ is odd

$a(1 + ab^3)$ is odd

we know that only the multiplication of two odd numbers gives an odd number.

Therefore a is odd and $(1 + ab^3)$ is odd.

$(1 + ab^3)$ is odd, so ab^3 will be even. (odd–1= even)

Since a is odd. so, for ab^3 to be even, b must be even.

Therefore, a is odd and b is even.

Hence, the correct answer is (D).

8. From the time the front of a train enters a platform, it takes 25 seconds for the back of the train to leave the platform, while travelling at a constant speed of 54 km/h. At the same speed, it takes 14 seconds to pass a man running at 9 km/h in the same direction as the train. What is the length of the train and that of the platform in meter, respectively?

A. 210 and 140 B. 162.5 and 187.5

C. 245 and 130 D. 175 and 200

Ans. D

Sol. Train speed = 54 km/h

Man speed = 9 km/h

Relative speed of the train with respect to man =54-9= 45 km/h

Time = 14 sec for crossing the man

So, the length of train = relative speed × time

$= 14 \times 45 \times \frac{5}{18}$

Length of train = 35 × 5 m = 175 m

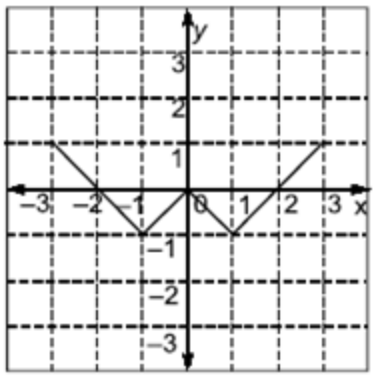
Given that train takes 25 sec to cross length of platform

Length of platform + length of train = speed of train x time

$= 54 \times \frac{5}{118} \times 25 = 15 \times 25 = 375$ m

Length of platform = 375 – 175 = 200 m

9. Which of the following functions describe the graph shows in the below figure.



A. $y = ||x| + 1| - 2$

B. $y = ||x| - 1| - 1$

C. $y = ||x| + 1| - 1$

D. $y = ||x - 1| - 1|$

Ans. B

Sol.

x	0	±1	±2
Y	0	−1	0

	x = 2	x = 1	x = −1	x = −2
$y = ||x| + 1| - 2$	1 (option falls)			
$y = ||x| - 1| - 1$	0	−1	−1	0
$y = ||x| + 1| - 1$	2 (option falls)			
$y = ||x - 1| - 1|$	0	1 (option falls)		

Hence only B option prevails.

10. Consider the following three statements:

1) Some roses are red

2) All red flowers fade quickly.

3) Some roses fade quickly.

Which of the following statements can be logically inferred from the above statements?

A. If (i) is true and (ii) is false, then (iii) is false.

B. If (i) is true and (ii) is false, then (iii) is true.

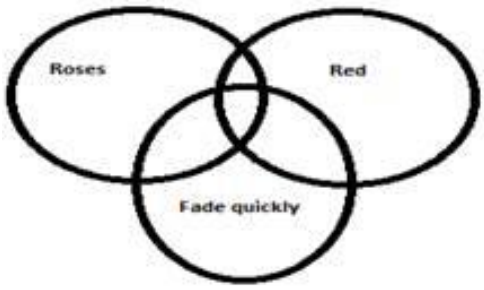
C. If (i) and (ii) are true, then (iii) is true.

D. If (i) and (ii) are false, then (iii) is false.

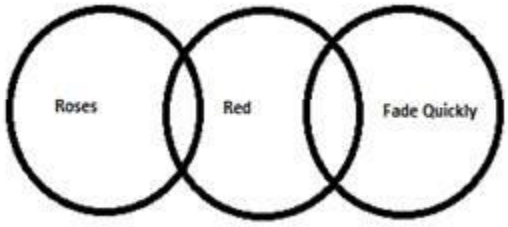
Ans. C

Sol. Solving by options

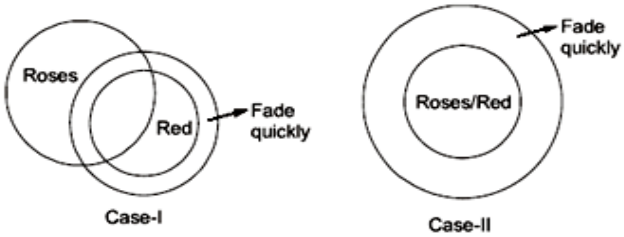
Option A: Even if statement 2nd is false, i.e. All red flowers do not fade quickly, that does not mean that some roses won't fade quickly.

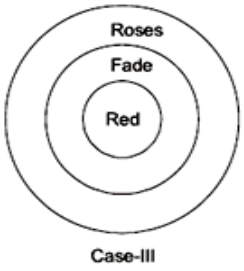


Option B: There can be a possibility that no rose fade quickly

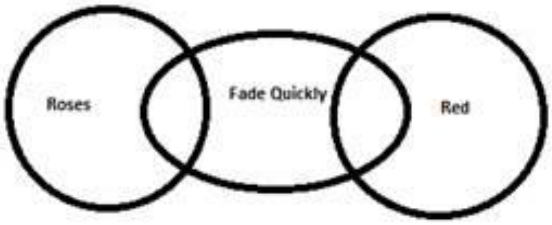


Option C: This is true in all possibilities.





Option D: There can be a possibility that some roses do fade quickly.



Hence option C is the only correct option.

SET-2

1. "The dress _____ her so well that they all immediately _____ her on her appearance."

The words that best fill the blanks in the above sentence are

A. complemented, complemented

B. complimented, complemented

C. complimented, complimented

D. complemented, complimented

Ans. D

Sol. Complement: a thing that contributes extra features to something else in such a way as to improve or emphasize its quality. Compliment: a polite expression of praise or admiration

2. "The judge's standing in the legal community, though shaken by false allegations of wrongdoing, remained _____."

The word that best fills the blank in the above sentence is

A. undiminished B. damaged

C. illegal D. uncertain

Ans. A

Sol. Even though there were false allegations, but judge's standing remained same.

From the given options only undiminished have a similar sense. So, option A is correct.

Undiminished: Not reduced.

3. Find the missing group of letters in the following series:

BC, FGH, LMNO, _____

A. UVWXY B. TUVWX

C. STUVW D. RSTUV

Ans. B

Sol. A **BC** DE **FGH** IJK **LMNO** PQRS **TUVWX**

4. The perimeters of a circle, a square and an equilateral triangle are equal. Which one of the following statements is true?

A. The circle has the largest area.

B. The square has the largest area.

C. The equilateral triangle has the largest area.

D. All the three shapes have the same area.

Ans. A

Sol. Let us take a circle (diameter as D), square (side=a) and an equilateral triangle (side=s) each of equal perimeter say 100m.

$\pi D = 4a = 3s = 100$

$D = 31.84$; $a = 25$; $s = 33.33$;

$\frac{\pi}{4}d^2 = 796.22$

$a^2 = 625$

$\frac{\sqrt{3}}{4}s^2 = 481.03$

Hence circle has largest area.

5. The value of the expression

$\frac{1}{1+\log_u vw} + \frac{1}{1+\log_v wu} + \frac{1}{1+\log_w uv}$ is _____.

A. -1 B. 0

C. 1 D. 3

Ans. C

Sol. $\frac{1}{1+\log_u vw} + \frac{1}{1+\log_v wu} + \frac{1}{1+\log_w uv}$

$\frac{1}{\log_u u + \log_u wv} + \frac{1}{\log_v v + \log_v uw} + \frac{1}{\log_w w + \log_w uv}$

$\frac{1}{\log_u uvw} + \frac{1}{\log_v uvw} + \frac{1}{\log_w uvw}$

$\log_{uvw} u + \log_{uvw} v + \log_{uvw} w$

$\log_{uvw} uvw$

= 1

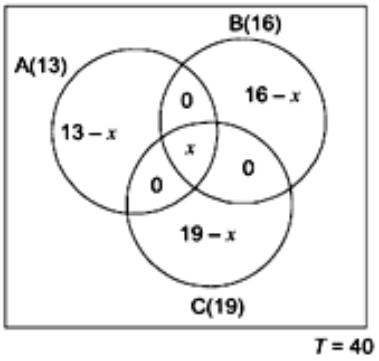
6. Forty students watched films A, B and C over a week. Each student watched either only one film or all three. Thirteen students watched film A, sixteen students watched film B and nineteen students watched film C. How many students watched all three films?

A. 0 B. 2

C. 4 D. 8

Ans. C

Sol.



Total student = 40

13 – x 16 – x + 19 – x + x = 40

Students watches all three movies,

x = 4

7. A wire would enclose an area of 1936 m^2, if it is bent into a square. The wire is cut into two pieces. The longer piece is thrice as long as the shorter piece. The long and the short pieces are bent into a square and a circle, respectively. Which of the following choices is closest to the sum of the areas enclosed by the two pieces in square meters?

A. 1096 B. 1111

C. 1243 D. 2486

Ans. C

Sol. Area = 1936 m^2

a^2 = 1936 m^2

a = 44 m

Length of wire = 4a

= 4 × 44 = 176 m

Part-1 length = 3 × 44 = 132 m

Part-2 length = 1 × 44 = 44 m

Long wire is bent in square.

4a = 132

a = 33 m

Area of square = 33^2 = 1089 m^2

Now, small wire is bent in circle,

So,

$\pi D = 44$

$\frac{22}{7} \times D = 44$

$D = 44$

Area of circle $= \frac{\pi}{4} \times D^2 = \frac{\pi}{4} \times 14^2$

$= 153.94\ m^2$

Total area enclosed = Area of square + Area of circle

$= 1089 + 153.94$

$= 1242.97 \approx 1243\ m^2$

8. A contract is to be completed in 52 days and 125 identical robots were employed, each operational for 7 hours a day. After 39 days, five-seventh of the work was completed. How many additional robots would be required to complete the work on time, if each robot is now operational for 8 hours a day?

A. 50 B. 89

C. 7 D. 175

Ans. C

Sol. Given that 5/7 of work is completed by 125 robots in 39 days with 7 hours a day.

So, 5/7 x T.W. = 125 x 39 x 7 x E --------(1)

Let "x" be the additional required robots to complete the remaining work on the time (52- 39 = 13 days), given that each robot is now operational for 8 hours a day.

So, 2/7 x T.W. = (125+x) x 13 x 8 x E----------(2)

on dividing equation 1 and 2,we get

$$\frac{5}{2} = \frac{125 \times 39 \times 7 \times E}{(125+x) \times 13 \times 8 \times E} = \frac{125 \times 3 \times 7}{(125+x) \times 8}$$

$$\Rightarrow (125 + x) = 131.25$$

$$\Rightarrow x = 6.25 \approx 7$$

9. A house has a number which needs to be identified. The following three statements are given that can help in identifying the house number.

i. If the house number is a multiple of 3, then it is a number from 50 to 59.

ii. If the house number is NOT a multiple of 4, then it is a number from 60 to 69.

iii. If the house number is NOT a multiple of 6, then it is a number from 70 to 79.

What is the house number?

A. 54 B. 65

C. 66 D. 76

Ans. D

Sol. Option A

54 is not divisible by 4, but 54 does not lie between 60 and 69. (doesn't follow the second statement.)

Hence 54 is not the answer.

Option B

65 is not divisible by 6, but 65 does not lie between 70 and 79. (doesn't follow the third statement)

Hence 65 is not them answer.

Option C

66 is divisible by 3, but 66 does not lie between 50 and 59. (don't follow the first statement.)

Hence 66 is not the answer.

Option D

76 is not divisible by 3

76 is divisible by 4

76 is not divisible by 6 and lies b/w 70 and 79.

follow all statements

Hence it is the correct answer.

10. An unbiased coin is tossed six times in a row and four different such trials are conducted. One trial implies six tosses of the coin. If H stands for head and T stands for tail, the following are the observations from the four trials:

(1) HTHTHT (2) TTHHHT

(3) HTTHHT (4) HHHT ___ ___.

Which statement describing the last two coin tosses of the fourth trial has the highest probability of being correct?

A. Two T will occur.

B. One H and one T will occur.

C. Two H will occur.

D. One H will be followed by one T.

Ans. B

Sol. Since the coin is unbiased, the probability of getting heads is equal of tail.

In an unbiased coin previous trials do not matter.

Option (A) Probability of getting both tails =1/2 x 1/2=1/4

Option (B) Probability of getting a head and a tail(HT+TH) = 2 x 1/2 x 1/2=1/2

Option (C) Probability of getting both heads = 1/2 x 1/2=1/4

Option (D) Probability of getting One H will be followed by one T =1/2 x 1/2 =1/4

We can see that option B has the highest probability as 1/2. Hence it is the right option.

****