

GATE 2017

Electrical Engineering

General Aptitude

Question Paper
& Solutions



1. The probability that a k-digit number does NOT contain the digits 0, 5 or 9 is
- A. 0.3^k B. 0.6^k
 C. 0.7^k D. 0.9^k

[2017 : 1 Mark, Set-1]

Ans. C

Sol.



Each digit can be filled in 7 ways as 0, 5 and 9 is not allowed, so each of these places can be filled by 1, 2, 3, 4, 6, 7, 8 so required probability is

$$\left(\frac{7}{10}\right)^k \text{ or } 0.7^k$$

$$\frac{fC}{TC} = \frac{7^k}{10^k} = 0.7^k$$

2. Find the smallest number y such that that $y \times 162$ is a perfect cube.
- A. 24 B. 27
 C. 32 D. 36

[2017 : 1 Mark, Set-1]

Ans. D

Sol. $y \times 162 = \text{Perfect cube}$

$$\text{Option, } y = 24 \Rightarrow 2^3 \times 3(2 \times 81)$$

\neq Not perfect cube

$$y = 27 \Rightarrow 3^3 \times (2 \times 3^4)$$

\neq Not perfect cube

$$y = 32 \Rightarrow 2^5 \times 2 \times 3^4$$

\neq Not perfect cube

$$y = 36 \Rightarrow 2^2 \times 3^2 \times 2 \times 3^4$$

$$= 2^3 \times 3^6$$

$$= (2 \times 3^2) \text{ is a perfect cube}$$

Hence the answer is,

$$y = 36$$

3. The expression $\frac{(x+y) - |x-y|}{2}$ is equal to

- A. the maximum of x and y
 B. the minimum of x and y

- C. 1
D. none of the above

[2017 : 2 Marks, Set-1]

Ans. B

Sol. $\frac{(x+y) - |x-y|}{2}$... (i)

If $x > y$ $|x-y| = x-y$;

If $x < y$ $|x-y| = y-x$

Now if $x > y$, above expression (i) becomes

$$\frac{(x+y) - (x-y)}{2} = \frac{2y}{2} = y = \text{minimum of } (x, y)$$

as $x > y$

Now if $x < y$;

$$\frac{x+y - (y-x)}{2} = \frac{2x}{2} = x = \text{minimum of } (x, y) \text{ as } x < y$$

Therefore, correct answer is option (B).

Method-2:

Use easy values,

$$x = 1 \text{ and } y = -2$$

Now, $\frac{(1-2) - |1-(-2)|}{2} = -2$

or $x = 2$ and $y = -1$

$$\frac{(2-1) - |2-(-1)|}{2} = \frac{1-3}{2} = -1$$

which is minimum of (x, y) .

Therefore, correct answer is option (B).

- 4.** Arun, Gulab, Neel and Shweta must choose one shirt each from a pile of four shirts coloured red, pink, blue and white respectively. Arun dislikes the colour red, and Shweta dislikes the colour white. Gulab and Neel like all the colours. In how many different ways can they choose the shirts so that no one has a shirt with a colour he or she dislikes?
- A. 21 B. 18
C. 16 D. 14

[2017 : 2 Marks, Set-1]

Ans. D

Sol. As there are 4 people A, G, N, S and four colours so without any restriction total ways have to be $4 \times 4 = 16$.

Now, Arun → dislike Red and Shweta dislikes white so $16 - 2 = 14$ ways.

Therefore, correct answer should be option (D).

Method-2:

Only one option is less than 16.

Therefore, correct answer should be option (D).

5. There are 3 red socks, 4 green socks and 3 blue socks. You choose 2 socks. The probability that they are of the same colour is

- A. $\frac{1}{5}$ B. $\frac{7}{30}$
C. $\frac{1}{4}$ D. $\frac{4}{15}$

[2017 : 1 Mark, Set-2]

Ans. D

Sol. Ways to collect both Red = 3C_2

Ways to collect both Green = 4C_2

Ways to collect both Blue = 3C_2

Total Ways = ${}^{10}C_2$

The probability that they are of the same colour is

$$P(\text{socks of same colour}) = \frac{({}^3C_2 + {}^4C_2 + {}^3C_2)}{{}^{10}C_2} = \frac{4}{15}$$

Hence, option D is correct.

6. A test has twenty questions worth 100 marks in total. There are two types of questions. Multiple choice questions are worth 3 marks each and essay questions are worth 11 marks each. How many multiple-choice questions does the exam have?

- A. 12 B. 15
C. 18 D. 19

[2017 : 1 Mark, Set-2]

Ans. B

Sol. Let x & y be the number of MCQ & essay-type questions respectively.

$$x + y = 20$$

$$3x + 11y = 100$$

After solving both the equations, we get,

$$x = 15, y = 5$$

Therefore, the number of multiple-choice questions in the exam is 15.

Hence, option B is correct.

- 7. The number of roots of $e^x + 0.5x^2 - 2 = 0$ in the range $[-5, 5]$ is
 - A. 0
 - B. 1
 - C. 2
 - D. 3

[2017 : 2 Marks, Set-2]

Ans. C

Sol. Given that: $f(x) = e^x + 0.5x^2 - 2$
 $f(-5) = 10.5, f(-4) = 6.01, f(-2) = 0.135,$
 $f(-1) = -1.13, f(0) = -1, f(1) = 1.21, f(2) = 7.38$
Similarly, $f(3), f(4), f(5)$ have positive values.

Therefore, as there are 2 sign changes from +ve to -ve and -ve to +ve, two roots will be there in the range $[-5, 5]$.
Hence, option C is correct.

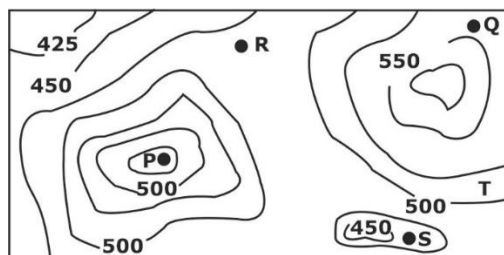
- 8. X is a 30-digit number starting with the digit 4 followed by the digit 7. Then the number X^3 will have
 - A. 90 digits
 - B. 91 digits
 - C. 92 digits
 - D. 93 digits

[2017 : 2 Marks, Set-2]

Ans. A

Sol. $X = (47.....)_{30\text{-digits}}$
Suppose $(47)^3 = 2 + 2 + 2$ digits in $(47)^3$
Similarly, $(47.....)_{30\text{-digits}}^3$
 $30 + 30 + 30 = 90$ digits
Hence, option A is correct.

- 9. A contour line joins locations having the same height above the mean sea level. The following is a contour plot of a geographical region. Contour lines are shown at 25 m intervals in this plot. If in a flood, the water level rises to 525 m, which of the villages P, Q, R, S, T get submerged?



- A. P, Q
- B. P, Q, T
- C. R, S, T
- D. Q, R, S

[2017 : 2 Marks, Set-1]

Ans. C

Sol. P will not get submerged as it is @ 550. So, P is not present in correct options. Hence (i) and (ii) option are incorrect. Now compare Q and T. As T is between 500 and 525. T will get submerged. Hence option (C) as among option C and D. T is present in only option (C).

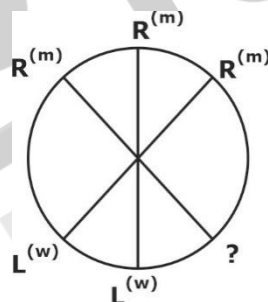
10. Six people are seated around a circular table. There are at least two men and two women. There are at least three right-handed persons. Every woman has a left-handed person to her immediate right. None of the women are right-handed. The number of women at the table is

- A. 2
- B. 3
- C. 4
- D. Cannot be determined

[2017 : 2 Marks, Set-1]

Ans. A

Sol. Out of six people. 3 place definitely occupied by right-handed people as at least 2 women are there so these two will sit adjacently. Now as only on seat is left it will be occupied by a left-handed man because on right side of this seat is sitting a right-handed man.

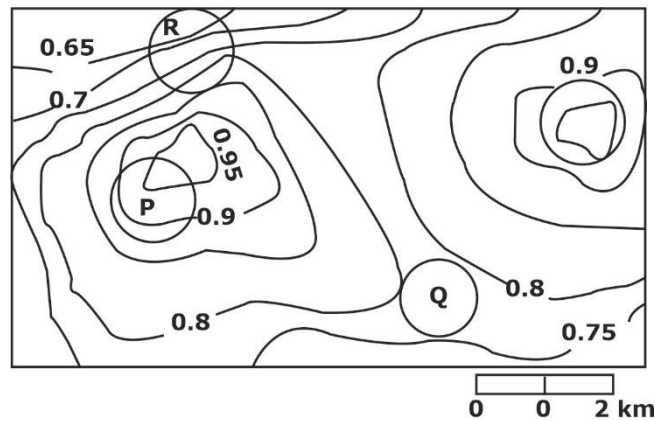


have to be a left-handed man.

Here, $R^{(m)}$ indicates right-handed man and $L^{(w)}$ indicates left-handed women.

Therefore, answer should be only 2 women.

11. An air pressure contour line join's locations in a region having the same atmospheric pressure. The following is an air pressure contour plot of a geographical region. Contour lines are shown at 0.05 bar intervals in this plot.



If the possibility of a thunderstorm is given by how fast air pressure rises or drops over a region, which of the following regions is most likely to have a thunderstorm?

- A. P
- B. Q
- C. R
- D. S

[2017 : 2 Marks, Set-2]

Ans. C

Sol. The possibility of thunderstorm is given by low fast air pressure rises or drops over region.

Region	Air pressure difference
P	$0.95 - 0.90 = 0.05$
Q	$0.80 - 0.75 = 0.05$
R	$0.85 - 0.65 = 0.20$
S	$0.95 - 0.90 = 0.05$

In general thunderstorms are occurred in a region where suddenly air pressure changes (i.e.,) should rise (or) sudden fall of air pressure. From the given contour map in R region only more changes in air pressure. So, the possibility of a thunderstorms in this region. So, option (C) is correct.

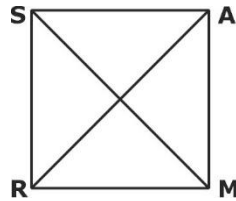
12. Rahul, Murali, Srinivas and Arul are seated around a square table. Rahul is sitting to the left of Murali. Srinivas is sitting to the right of Arul. Which of the following Paris are seated opposite each other?

- A. Rahul and Murali
- B. Srinivas and Arul
- C. Srinivas and Murali
- D. Srinivas and Rahul

[2017 : 1 Mark, Set-1]

Ans. C

Sol. Following seating arrangement can be drawn



Therefore, correct option is (C).

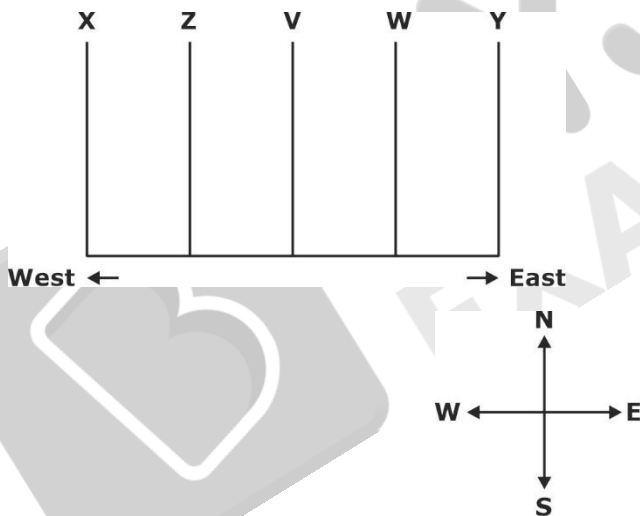
13. There are five buildings called V, W, X, Y and Z in a row (not necessarily in that order). V is to the West of W. Z is to the East of X and the West of V. W is to the West of Y. Which is the building in the middle?

- A. V
- B. W
- C. X
- D. Y

[2017 : 1 Mark, Set-2]

Ans. A

Sol. From the given data, the following is formed.



The building 'V' is in the middle. Hence, option A is correct.

14. After Rajendra Chola returned from his voyage to Indonesia, he _____ to visit the temple in Thanjavur.

- A. was wishing
- B. is wishing
- C. wished
- D. had wished

[2017 : 1 Mark, Set-1]

Ans. C

Sol. Correct option is wished. After Rajender Chola returned from his voyage to Indonesia, he wished to visit the temple in Thanjavur. Both are events of past. Use of past perfect form is unwarranted as it reflects part of past.

- 15.** Research in the workplace reveal that people work for many reasons _____.
A. money beside B. beside money
C. money besides D. besides money

[2017 : 1 Mark, Set-1]

Ans. D

Sol. Besides money.

Research in the workplace reveals the people works for many reasons besides money.

Besides conveys the meaning of 'in addition' Beside means 'next to'.

- 16.** "The hold of the nationalist imagination on our colonial past is such that anything inadequately or improperly nationalist is just not history."
Which of the following statements best reflects the author's opinion?
A. Nationalists are highly imaginative.
B. History is viewed through the filter of nationalism.
C. Our colonial past never happened.
D. Nationalism has to be both adequately and properly imagined.

[2017 : 2 Marks, Set-1]

Ans. B

Sol. To refer is to reach an opinion. The right opinion of the author is 'History is viewed through the filter of nationalism' so (B) is the right opinion of the author. The key words in the statement are 'history and nationalist imagination'.

- 17.** Choose the option with words that are not synonyms.
A. aversion, dislike B. luminous, radiant
C. plunder, loot D. yielding, resistant

[2017 : 1 Mark, Set-2]

Ans. D

Sol. 'Yielding' means tending to do whereas 'resistant' means opposed to something, so both are not synonyms. Hence, option D is correct.

- 18.** Saturn is _____ to be seen on a clear night with the naked eye.
A. enough bright B. bright enough
C. as enough bright D. bright as enough

[2017 : 1 Mark, Set-2]

Ans. B

Sol. The word 'enough' as an adverb falls after the adjective so 'bright enough' is the right answer.

Hence, option B is correct.

19. "We lived in a culture that denied any merit to literary works, considering them important only when they were handmaidens to something seemingly more urgent—namely ideology. This was a country where all gestures, even the most private, were interpreted in political terms,". The author's belief that ideology is not as important as literature is revealed by the word:

- A. 'culture'
- B. 'seemingly'
- C. 'urgent'
- D. 'political'

[2017 : 2 Marks, Set-2]

Ans. B

Sol. Seemingly means external appearance as distinguished from true character – means it is not actually what it looks like.

"considering them important only when they were handmaidens (means assisting or helping) to something seemingly more urgent" means it looks like urgent but in real it is not so urgent.

So, ideology is not as important as literature, is revealed by the word "seemingly".

20. There are three boxes. One contains apples, another contains oranges. All three are known to be incorrectly labelled. If you are permitted to open just one box and then pull out and inspect only one fruit, which box would you open to determine the contents of all three boxes?

- A. The box labelled 'Apples'
- B. The box labelled 'Apples and Oranges'
- C. The box labelled 'oranges'
- D. Cannot be determined

[2017 : 2 Marks, Set-2]

Ans. B

Sol. The person who is opening the boxes, he knew that all 3 are marked wrong.

Suppose if 3 boxes are labelled as below:



(1) Apples (2) Oranges (3) Apples & Orange

If he inspected from box (1), picked one fruit, found orange, then he don't know whether box contains oranges (or) both apples and oranges.

Similarly, if he picked one fruit from box (2), found apple then he doesn't know whether box contain apples (or) both apples and oranges.

But if he picked one fruit from box (3), i.e., labelled is "apples and oranges", if he found apple then he can decide compulsorily that box (3) contains apples and as he knew all boxes are labelled as incorrect, he can tell box (2) contains both apples and

oranges, box (1) contain remaining oranges. So, he should open box labelled "Apples and Oranges" to determine contents of all the three boxes.

