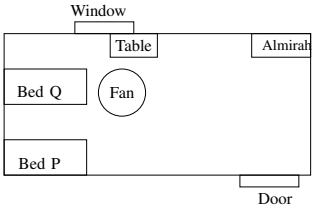
GATE-2024-EE-1-13

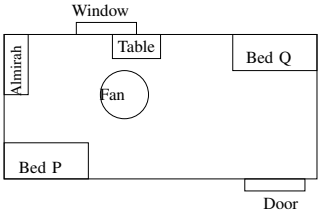
EE24BTECH11047 - Niketh Prakash Achanta

1) If '$\rightarrow$' denotes increasing order of intensity, then the meaning of the words [talk $\rightarrow$ shout $\rightarrow$ scream] is analogous to [please $\rightarrow$ _____ $\rightarrow$ pander]. Which one of the given options is appropriate to fill the blank?
   a) flatter
   b) flutter
   c) fritter
   d) frizzle

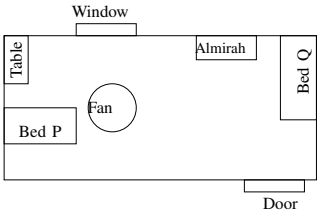
2) P and Q have been allotted a hostel room with two beds, a study table, and an almirah. P is an avid bird-watcher and wants to sit at the table and watch birds outside the window. Q does not mind that as long as his bed is close to the ceiling fan.
   Which one of the following arrangements suits them the most?



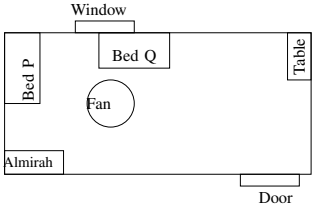
a)



b)



c)



d)

3) The decimal number system uses the characters 0, 1, 2, ..., 8, 9, and the octal number system uses the characters 0, 1, 2, ..., 6, 7.
For example, the decimal number 12 (= $1 \times 10^1 + 2 \times 10^0$) is expressed as 14 (= $1 \times 8^1 + 4 \times 8^0$) in the octal number system.
The decimal number 108 in the octal number system is
   a) 168
   b) 108
   c) 150
   d) 154

4) A shopkeeper buys shirts from a producer and sells them at 20% profit. A customer has to pay Rs.3,186.00 including 18% taxes, per shirt. At what price did the shopkeeper buy each shirt from the producer?
   a) Rs.2,500.00
   b) Rs.1,975.40
   c) Rs.2,700.00
   d) Rs.2,548.80

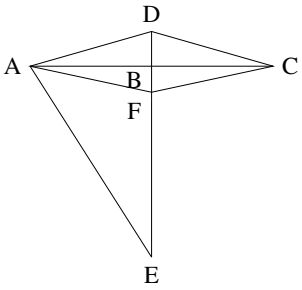
5) If, for non-zero real variables x, y, and real parameter $\alpha > 1$,
$$x : y = (\alpha + 1) : (\alpha - 1),$$
then, the ratio $(x^2 - y^2) : (x^2 + y^2)$ is
   a) $2\alpha : (\alpha^2 + 1)$

b) $\alpha : (\alpha^2 + 1)$
c) $2\alpha : (\alpha^2 - 1)$
d) $\alpha : (\alpha^2 - 1)$

6) In the given text, the blanks are numbered (i)–(iv). Select the best match for all the blanks.
Following a row _____ (i) the shopkeeper _____ (ii) the price of a frying pan, the cook stood _____ (iii) a row to withdraw cash _____ (iv) the ATM booth.

a) (i) with (ii) over (iii) at (iv) with
b) (i) at (ii) over (iii) over (iv) in
c) (i) with (ii) over (iii) in (iv) at
d) (i) over (ii) with (iii) over (iv) at

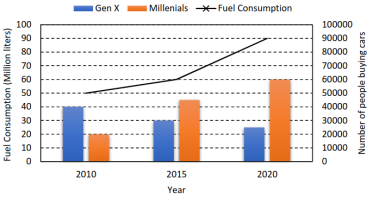
7) In the following figure, CD = 5 cm, BE = 10 cm, AE = 12 cm, $\angle DAB = \angle DCB$, and $\angle DAE = \angle DBC = 90°$. Points AFCD create a rhombus. The length of BF



(in cm) is

a) 3
b) 2
c) 4
d) 6

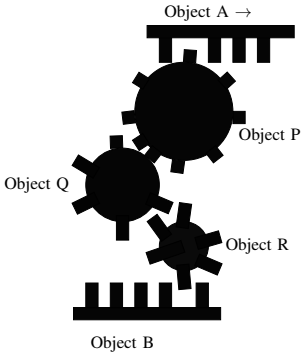
8) The chart below shows the data of the number of cars bought by Millennials and Gen X people in a country from the year 2010 to 2020, as well as the yearly fuel consumption of the country (in Million liters). Considering the data presented in the chart, which one



of the following options is true?

a) The percentage increase in fuel consumption from 2010 to 2015 is more than the percentage increase in fuel consumption from 2015 to 2020.
b) The increase in the number of Millennial car buyers from 2015 to 2020 is less than the decrease in the number of Gen X car buyers from 2010 to 2015.
c) The increase in the number of Millennial car buyers from 2010 to 2015 is more than the decrease in the number of Gen X car buyers from 2010 to 2015.
d) The decrease in the number of Gen X car buyers from 2015 to 2020 is more than the increase in the number of Millennial car buyers from 2010 to 2015.

9) The assembly shown has three teething circular objects (Pinions) and two teething flat objects (Racks), which are perfectly mating with each other. Pinions can only rotate clockwise or anti-clockwise, staying at their own center. Racks can translate towards the left ($\leftarrow$) or the right ($\rightarrow$) direction.
If the object A (Rack) is translating towards the right ($\rightarrow$) direction, the correct statement among the following is:



a) Object B translates towards the right direction.
b) Object B translates towards the left direction.
c) Object R rotates in the anticlockwise direction.
d) Object Q rotates in the clockwise direction.

10) A surveyor has to measure the horizontal distance from her position to a distant reference point C. Using her position as the center, a 200 m horizontal line segment is drawn with the two endpoints A and B. Points A, B, and C are not collinear. Each of the angles $\angle CAB$

and $\angle CBA$ are measured as 87.8°. The distance (in m) of the reference point C from her position is nearest to

a) 2603
b) 2606
c) 2306
d) 2063

11) Which one of the following matrices has an inverse?

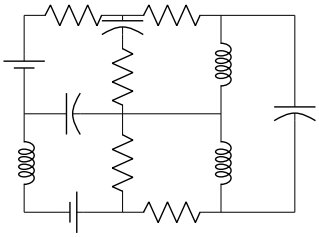
a)
$$\begin{pmatrix} 1 & 4 & 8 \\ 0 & 4 & 2 \\ 0.5 & 2 & 4 \end{pmatrix}$$

b)
$$\begin{pmatrix} 1 & 2 & 3 \\ 2 & 4 & 6 \\ 3 & 2 & 9 \end{pmatrix}$$

c)
$$\begin{pmatrix} 1 & 4 & 8 \\ 0 & 4 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

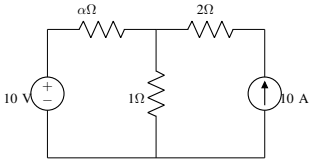
d)
$$\begin{pmatrix} 1 & 4 & 8 \\ 0 & 4 & 2 \\ 3 & 12 & 24 \end{pmatrix}$$

12) The number of junctions in the circuit is



a) 6
b) 7
c) 8
d) 9

13) All the elements in the circuit are ideal. The power delivered by the 10 V source in watts is



a) 0
b) 50
c) 100
d) dependent on the value of α