2011-EE-1-13

AI24BTECH11002 - K. Akshay Teja

1) Choose the most appropriate word from the options given below to complete the following sentence:
Under ethical guidelines recently adopted by the Indian Medical Association, human genes are to be manipulated only to correct diseases for which _____ treatments are unsatisfactory.

a) similar b) almost c) uncommon d) unavailable

2) Choose the word from the options given below that is most nearly opposite in meaning to the given word:
Frequency

a) periodicity b) rarity c) gradualness d) persistancy

3) Choose the most appropriate word from the options given below to complete the following sentence:
It was her view that the country's problems had been _____ by foreign technocrats, so that to invite them to come back would be counter-productive.

a) identified b) ascertained c) exacerbated d) analysed

4) There are two candidates P and Q in an election. During the campaign, 40% of the voters promised to vote for P and the rest for Q. However, on the day of the election, 15% of the voters went back on their promise to vote for P and voted for Q instead. Suppose, 25% of the voters went back on their promise to vote for Q and instead voted for P. Suppose P lost by 2 votes, then what was the total number of voters?

a) 100 b) 110 c) 90 d) 95

5) The question below consists of a pair of related words followed by four pairs of words. Select the pair that best expresses the relation in the original pair.
Gladiator : Arena

a) dancer : stage
b) commuter : train
c) teacher : classroom
d) lawyer : courtroom

6) The sum of n terms of the series $4 + 44 + 444 + \ldots$ is

a) $\frac{4}{81}\left[10^{n+1} - 9n - 1\right]$
b) $\frac{4}{81}\left[10^{n-1} - 9n - 1\right]$
c) $\frac{4}{81}\left[10^{n+1} - 9n - 10\right]$
d) $\frac{4}{81}\left[10^{n} - 9n - 10\right]$

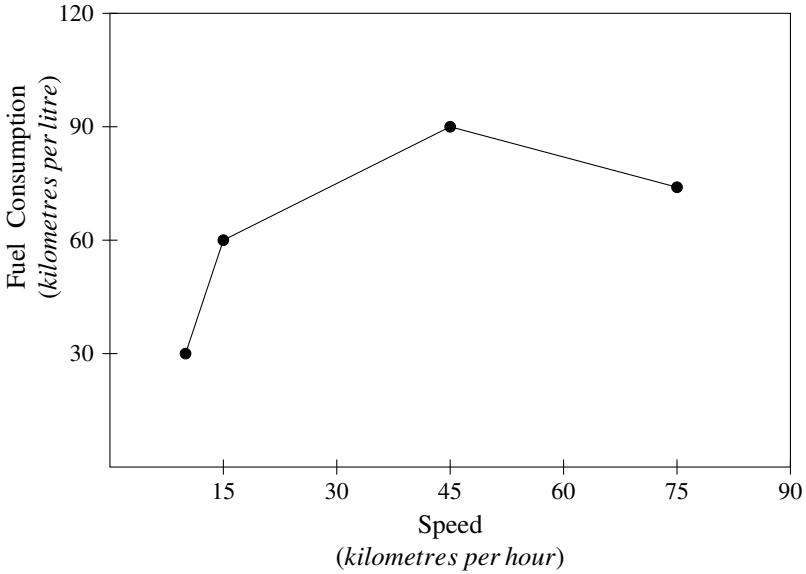
7) Given that $f(y) = \frac{|y|}{y}$, and q is any non-zero real number, the value of $|f(q) - f(-q)|$ is

a) 0 b) -1 c) 1 d) 2

8) Three friends, R, S, and T shared toffees from a bowl. R took $\frac{1}{3}$ of the toffees, but returned four to the bowl. S took $\frac{1}{4}$ of what was left but returned three toffees to the bowl. T took half of the remainder but returned two back into the bowl. If the bowl had 17 toffees left, how many toffees were originally there in the bowl?

a) 38
b) 31
c) 48
d) 41

9) The fuel consumed by a motorcycle during a journey while traveling at various speeds is indicated in the graph below.



The distances covered during four laps of the journey are listed in the table below: From the given

Lap	Distance (kilometres)	Average speed (kilometres per hour)
P	15	15
Q	75	45
R	40	75
S	10	10

data, we can conclude that the fuel consumed per kilometre was least during the lap

a) P b) Q c) R d) S

10) The horse has played a little-known but very important role in the field of medicine. Horses were injected with toxins of diseases until their blood built up immunities. Then a serum was made from their blood. Serums to fight diphtheria and tetanus were developed this way.
It can be inferred from the passage that horses were

a) given immunity to diseases
b) generally quite immune to diseases
c) given medicines to fight toxins
d) given diphtheria and tetanus serums

11) A vector field is called solenoidal if its divergence is zero. Consider the vector fields $\overrightarrow{P}$ and $\overrightarrow{Q}$ given by

$$\overrightarrow{P}(x,y,z) = \left(2x^2 + 8xy^2z\right)\hat{i} + \left(3x^3y - 3xy\right)\hat{j} - \left(4y^2z^2 + 2x^3z\right)\hat{k} \text{ and}$$

$$\overrightarrow{Q}(x,y,z) = xyz^2\overrightarrow{P}(x,y,z)$$

Then

a) $\overrightarrow{P}$ and $\overrightarrow{Q}$ are both solenoidal
b) both $\overrightarrow{P}$ and $\overrightarrow{Q}$ are not solenoidal
c) $\overrightarrow{P}$ is solenoidal but not $\overrightarrow{Q}$
d) $\overrightarrow{Q}$ is solenoidal but not $\overrightarrow{P}$

12) The eigenvalues of a 3×3 matrix P are 2, 2, and -1. Then P^{-1} is equal to

a) $\frac{1}{4}\left(3P - P^2\right)$ b) $\frac{1}{2}\left(P^2 - 2P\right)$ c) $\frac{-1}{2}\left(P^2 + 3P\right)$ d) $\frac{-1}{4}\left(P^2 + 2P\right)$

13) The integral $\int_{-5\pi/2}^{5\pi/2} f(x)\,dx$, where $f(x) = e^{\pi x^2}\sin^3 x + 4\cos x$, equals

a) 4 b) 8 c) $\frac{5\pi}{2}$ d) $\frac{-5\pi}{2}$