

2010-PH-'53-65'

AI24BTECH11006 - Bugada Roopansha

- 53) If the permittivity ε and permeability μ assume negative values in a certain frequency range, then the directions of the propagation vector \mathbf{k} and the Poynting vector \mathbf{S} in that frequency range are related as:
- \mathbf{k} and \mathbf{S} are parallel.
 - \mathbf{k} and \mathbf{S} are anti-parallel.
 - \mathbf{k} and \mathbf{S} are perpendicular to each other.
 - \mathbf{k} and \mathbf{S} make an angle that depends on the magnitudes of (ε) and (μ) .
- 57) Which of the following options is the closest in meaning to the word below:
Circuitous
- cyclic
 - indirect
 - confusing
 - crooked
- 58) Choose the most appropriate word from the options given below to complete the following sentence:

If we manage to ...our natural resources, we would leave a better planet for our children.

- uphold
 - restrain
 - cherish
 - conserve
- 59) 25 persons are in a room. 15 of them play hockey, 17 of them play football, and 10 of them play both hockey and football. Then the number of persons playing neither hockey nor football is:
- 2
 - 17
 - 13
 - 3
- 60) 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.

Unemployed: Worker

- fallow : land
- unaware : sleeper
- wit : jester
- renovated : house

I. STATMENTS FOR LINKED QUESTIONS

54, 55

The Lagrangian for a simple pendulum is given by:

$$L = \frac{1}{2}ml^2\dot{\theta}^2 - mgl(1 - \cos\theta)$$

54) Hamilton's equations are then given by:

- $\dot{p}_\theta = -mgl \sin\theta; \dot{\theta} = \frac{p_\theta}{ml^2}$
- $\dot{p}_\theta = -mgl \sin\theta; \dot{\theta} = \frac{p_\theta}{ml^2}$
- $\dot{p}_\theta = -m\dot{\theta}; \dot{\theta} = \frac{p_\theta}{m}$
- $\dot{p}_\theta = -\left(\frac{g}{l}\right)\theta; \dot{\theta} = \frac{p_\theta}{ml}$

55) The Poisson bracket between θ and $\dot{\theta}$ is:

- $\left(\theta, \dot{\theta}\right) = 1$
- $\left(\theta, \dot{\theta}\right) = \frac{1}{ml^2}$
- $\left(\theta, \dot{\theta}\right) = \frac{1}{m}$
- $\left(\theta, \dot{\theta}\right) = \frac{g}{l}$

II. GENERAL APTITUDE (GA) QUESTIONS

A. Q.56 - Q.60 carry one mark each

56) Choose the most appropriate word from the options given below to complete the following sentence:

His rather casual remarks on politics ... his lack of seriousness about the subject.

- masked
- belied
- betrayed

B. Q.61 - Q.65 carry two marks each.

61) If $137 + 276 = 435$, how much is $731 + 672$?

- 534
- 1403

c) 1623

d) 1513

- 62) Hari (*H*), Gita (*G*), Irfan (*I*), and Saira (*S*) are siblings (*i.e.*, *brothersandsisters*). All were born on 1st January. The age difference between any two successive siblings (*that is, bornoneafteranother*) is less than 3 years. Given the following facts:

- Hari's age + Gita's age > Irfan's age + Saira's age.
- There are no twins.
- The age difference between Gita and Saira is 1 year. However, Gita is not the oldest, and Saira is not the youngest.

In what order were they born (*oldestfirst*)?

a) HSI G

b) SGHI

c) IGSH

d) IHSG

- 63) **Modern warfare has changed from large-scale clashes of armies to the suppression of civilian populations. Chemical agents that do their work silently appear to be suited to such warfare; and regretfully, there exist people in military establishments who think that chemical agents are useful tools for their cause.**

Which of the following statements best sums up the meaning of the above passage:

- a) Modern warfare has resulted in civil strife.
- b) Chemical agents are useful in modern warfare.
- c) Use of chemical agents in warfare would be undesirable.
- d) People in military establishments like to use chemical agents in war.

- 64) 5 skilled workers can build a wall in 20 days; 8 semi-skilled workers can build a wall in 25 days; 10 unskilled workers can build a wall in 30 days. If a team has 2 skilled, 6 semi-skilled, and 5 unskilled workers, how long will it take to build the wall?

a) 20 days

b) 18 days

c) 16 days

d) 15 days

- 65) Given the digits 2, 2, 3, 3, 3, 4, 4, 4, 4 how many distinct 4-digit numbers greater than 3000 can

be formed?

a) 50

b) 51

c) 52

d) 54