

D 53491

(Pages : 4)

Name.....

Reg. No.....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, JANUARY 2014

(UG—CCSS)

Core Course

Physics

PH IB 01—METHODOLOGY OF SCIENCE AND PHYSICS

(2011 and 2012 Admissions)

Time : Three Hours

Maximum : 80 Weightage

Part A

Answer all questions.

Each question carries ¼ weightage.

1. Theoretical knowledge obtained from demonstration and deductive reasoning is called _____.

2. Newtons laws are valid only when :

(a) $\frac{v}{c} < 1.$

(b) $\frac{v}{c} < < 1.$

(c) $\frac{v}{c} = 1.$

(d) $\frac{v}{c} > 1.$

3. The red shift effect shows that :

(a) Universe is expanding.

(b) Support Big Bang theory.

(c) Both (a) and (b).

(d) None of the above.

4. Theoretical knowledge obtained as the result of inductive reasoning is called :

(a) Epistome.

(b) Nous.

(c) Science.

(d) None of the above.

5. Wavelength associated with a moving electron with momentum 'p' is :

(a) $\lambda = \frac{p}{h}.$

(b) $\lambda = p \cdot h.$

(c) $\lambda = \frac{h}{p}.$

(d) $\lambda h = PE.$

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6. The strength of photoelectric current is directly proportional to :
- (a) Frequency of incident light.
 - (b) Intensity of incident light.
 - (c) Potential difference between the plate.
 - (d) None of the above _____.
7. Compton effect is associated with :
- (a) γ -rays.
 - (b) X-rays.
 - (c) β -rays.
 - (d) Positive rays.
8. The wave theory and the quantum theory _____ each other.
9. Who discovered X-rays :
- (a) Roentgen.
 - (b) Einstein.
 - (c) Planck.
 - (d) None of the above.
10. Pick up the axial vector :
- (a) Force.
 - (b) Acceleration.
 - (c) Linear momentum.
 - (d) Torque.
11. The magnitude of vector product of two non-zero vectors \vec{A} and \vec{B} is zero. The scalar product of \vec{A} and $\vec{A} + \vec{B}$ is equal to :
- (a) Zero.
 - (b) AB .
 - (c) A^2 .
 - (d) $A^2 + AB$.
12. If vectors $\vec{a} = 2\hat{i} + 4\hat{j} - \hat{k}$ and $\vec{b} = 3\hat{i} - 2\hat{j} + x\hat{k}$ are to be perpendicular to each other, the value of x should be :
- (a) 2.
 - (b) -2.
 - (c) 3.
 - (d) -3.

Part B*Answer all questions.**Each question carries 1 weightage.*

13. What distinguish science from other approaches to gaining knowledge ?
14. What is hypothesis ?
15. What are ad-hoc hypotheses ?
16. Give the significance of pees review.
17. What is LASER ?
18. What is population inversion ?
19. What is Twin paradox ?
20. State Gauss, Divergence Theorem.
21. What is transpose of a matrix ?

(9 × 1 = 9 weightage)**Part C***Answer any five questions.**Each question carries 2 weightage.*

22. Discuss the sociological criteria of scientific theories.
23. What do you mean by corroboration ? Explain with suitable example.
24. Explain with suitable example how theoretical knowledge is obtained on the basis of inductive and deductive reasoning.
25. Discuss the phenomenon of spontaneous and stimulated emission.
26. Prove that $(A \times B) \times C + (B \times C) \times A + (C \times A) \times B = 0$.
27. Show that the modulus of each eigen value of a unitary matrix is unity.
28. Explain the role of mathematics in Physics.

(5 × 2 = 10 weightage)**Turn over**

Part D

*Answer any two questions.
Each question carries 4 weightage.*

29. What are the different steps involved in a scientific study? Explain.
30. (a) Discuss the concept of ordinary and monochromatic light.
(b) Briefly explain coherent and incoherent light.
31. What are the basic ideas of matrices? With suitable example explain addition, subtraction and scalar multiplication.

(2 × 4 = 8 weightage)

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