

17U126

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Name:

Reg. No.....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2017

(Regular/Supplementary/Improvement)

(CUCBCSS-UG)

CC15UPH1B01- METHODOLOGY OF SCIENCE AND PHYSICS

(Physics - core Course)

(2015 Admission Onwards)

Time: Three Hours

Maximum: 80 Marks

Section A

Answer *all* questions. Each question carries 1 mark.

1. _____ is an example of pseudoscience.
2. The word 'science' comes from the latin word 'Scientia' meaning _____.
3. _____ is the ability for directly understanding truth, without conscious reasoning or study.
4. The Michelson Morley experiment disapproved the _____ hypothesis.
5. _____ production is regarded as the inverse of photoelectric effect.
6. _____ is a method to produce population inversion in laser.
7. The curl of a conservative force field is _____.
8. The condition for a solenoidal vector 'A' is _____.
9. A square matrix 'A' is said to be Hermitian, if _____.
10. Sum of the diagonal elements of a matrix is called _____.

(10 x 1 = 10 marks)

Section B

Answer *all* questions. Each question carries 2 marks.

11. Distinguish between theoretical knowledge and practical knowledge.
12. Explain the significance of peer review in research area.
13. What is called 'Ultraviolet catastrophe' in classical physics?
14. Write a short note on metastable state.
15. State and explain the fundamental theorem of gradients.
16. Give the physical interpretation of divergence and curl of a vector quantity.
17. What is meant by eigen values and eigen vectors?

(7 x 2 = 14 marks)

Section C

Answer any *five* questions. Each question carries 4 marks.

18. Outline the major steps followed in a scientific method.
19. Write down the conditions for a valid hypothesis. What do you mean by auxiliary hypothesis and adhoc hypothesis?

20. Write short notes on (i) corroboration and (ii) falsification.
21. How did Einstein successfully apply the quantum theory to explain the observations of photoelectric effect?
22. Briefly explain the idea of LASER.
23. Obtain the elemental displacement in spherical polar coordinate system.
24. Show the Cramer's rule can be applied to solve a system of linear equations.

(5 x 4 = 20 marks)

Section D

Answer any *four* questions. Each question carries 4 marks.

25. Find the de Broglie wavelength of a 46g golf ball moving with velocity of 10m/s.
26. If a sphere of radius 1m long is moving along x-axis with a velocity $0.6c$, what would be the shape of the object as observed on earth?
27. Find the value of λ so that the vectors $=2+4$ and $=8+5$ are coplanar.
28. Evaluate.
29. Prove that the matrix is unitary.
30. Given . Show that trace of A is same as the sum of the Eigen values of A.
31. Find a and b if, the matrix

(4 x 4 = 16 marks)

Section E

Answer any *two* questions. Each question carries 10 marks.

32. Discuss in detail, the revolution in science and technology.
33. What are the postulates of special theory of relativity? Discuss in detail
(i) length contraction, (ii) time dilation and (iii) twin paradox.
34. Discuss the various steps involved in designing of an experiment.
35. Discuss the cylindrical curvilinear coordinate system.

(2 x 10 = 20 marks)
