E 4227 (Pages : 2) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2016

First Semester

Core Course—METHODOLOGY IN PHYSICS

(Common for B.Sc. Physics (Model I) ; B.Sc. Physics (Model II)
B.Sc. Physics Instrumentation and EEM)

[2013 Admission onwards]

Time : Three Hours Maximum Marks : 60

Candidates can use Clark's tables and
Scientific non-programmable calculators.

Part A (Very Short Answer Questions)

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

1. What is Chandrasekhar limit ?
2. What are the advantages of Ga As technology ?
3. State Kepler's second law.
4. List different errors of digital measuring instruments.
5. What is dynamic calibration ?
6. What are the applications of Nano-technology ?
7. What is Parallax error ?
8. How mass of an object varies with velocity ?

$(8 \times 1 = 8)$

Part B (Brief Answer Questions)

Answer any **six** *questions.*
Each question carries 2 *marks.*

9. Discuss Ptolemic system of universe.
10. Enumerate the features of deterministic universe.
11. What are the contributions of Saha ?
12. Differentiate between Hypothesis and Theories.

Turn over

13. Explain the steps in peer review.
14. How a travelling microscope works ?
15. How stellar parallax can be measured ?
16. With suitable examples, explain absolute errors and relative errors.
17. What is spurious measurements ? How they are taken care of ?
18. What is the significance of standard deviation of errors ? What information does it convey ?

(6 × 2 = 12)

Part C (Derivations/Problems/Short Essays)

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

19. What is Galilean transformation ? Derive Galilean transformation equations.
20. Discuss mass variation according to special theory of relativity.
21. In the laboratory the two particles are observed to travel in opposite directions with speed 2.80×10^{10} cm/sec. Deduce the relative speed of the particles.
22. With diagrams, explain how a galvanometer can be converted to measure a 0 – 250 V range voltmeter.
23. Explain the measurement of stellar parallaxes.
24. The following measurements are obtained while measuring line voltage :

    219.9 V, 222.2 V, 215.7 V, 219.2 V, 220.0 V,

    223.3 V, 215.0 V, 224.5 V, 220.8 V, 216.7 V.

    Calculate (i) the mean ; (ii) standard deviation ; (iii) the probable error of mean ; and (iv) the probable error of one measurement.

(4 × 4 = 16)

Part D (Long Essays)

Answer any **two** *questions.*
Each question carries 12 marks.

25. With examples, describe proving, disproving, corroboration and falsification in Physics.
26. Write an essay on the contributions made by the Indian Scientists in the field of Physics.
27. Explain the various types of measurement of time, their significant features and fields where they are used.
28. Define, classify and explain the various types of errors in electrical—analog and digital measuring instruments.

(2 × 12 = 24)