

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, NOVEMBER 2014**First Semester****Core Course—METHODOLOGY IN PHYSICS**

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

[2013 Admission onwards]

Time : Three Hours

Maximum : 60 Marks

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

Part A (Short Answer Questions)

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

1. What do you mean by "Unification of all forces of nature" ?
2. Why is revision of scientific theories important ?
3. Explain the geocentric model of ptolemy.
4. Describe the working of sun dials.
5. What are absolute and relative errors ?
6. What do you mean by standard deviation ? How is it different from mean and variance ?
7. How can we measure stellar parallax ?
8. What is corroboration ?

(8 × 1 = 8)

Part B (Brief Answer Questions)

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

9. Discuss Gallileo's experiments.
10. Explain the contributions of S.N. Salia.
11. Give the history of nano technology.
12. Explain the significance of patents and publications.
13. Explain the working principle of a laser range finder ? What are its merits ?
14. With a neat sketch, explain Micrometer.
15. Discuss different methods of Calibration.
16. Discuss the graphical representation of error bars.

Turn over

17. What is the significance of products and quotients on errors ?
18. What are the common errors in digital instruments ?

(6 × 2 = 12)

Part C (Problems/Derivations/Short Essays)

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

19. Calculate the effective mass and momentum of a photon of wavelength 620.3 nm.
20. What are the postulates of Einstein's theory of relativity ? Explain.
21. With the help of neat diagrams, explain the working of a tangent galvanometer.
22. Explain the principle of angle measurement with the help of spectrometer verniers.
23. While measuring a temperature the following readings were recorded :

39.6, 39.9, 39.7, 39.9, 40.0, 39.8, 39.9, 39.8, 40.4, 39.7

Calculate the following :—

- (i) the mean ;
 - (ii) the standard deviation ;
 - (iii) the probable error of one reading ;
 - (iv) the probable error of mean.
24. A known current of 80A is measured by an ammeter. If 40% of the readings are within 0.8 A of true value, determine the following :—
 - (i) the standard deviation for the meter ;
 - (ii) the probability of an error of 1.2 A.

(4 × 4 = 16)

Part D (Long Essays)

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

25. Explain the development of different models of the Universe.
26. Discuss the contributions of Newton and Einstein to the Physics.
27. Explain, with necessary diagrams, how analog and digital multimeters are given multiple ranges for measuring voltage, current and resistances.
28. Define and classify different types of errors in instruments and their statistical analysis with the help of examples.

(2 × 12 = 24)