B. Sc. DEGREE EXAMINATION-NOVEMBER 2014

FIRST SEMESTER - PHYSICS (CORE)

COURSE - U1CRPHY1: METHODOLOGY IN PHYSICS

Time: Three Hours Max. Marks: 60

Part A
Very short Answer questions

(Answer **All** questions. Each question carries 1 mark.)

1. Explain the significance of Chandrasekhar limit
2. Define “Nanomaterials”
3. Explain the concept of expanding universe.
4. Write 45678 as a three significant number.
5. What is the principle of GPS?
6. What is meant by calibration?
7. Volume measurement of a cube is done using a scale with ends tore off. What type of error present here?
8. Mention any two differences between LASER and visible light. (8 x 1 = 8 Marks)

Part B
Short Answer questions

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

9. Explain Kepler’s laws of planetary motion.
10. What are the advantages of taking patent?
11. The internal resistance of volt meter is very high and the internal resistance of ammeter is very low. Why?
12. What are the advantages of scale and telescope arrangement in measuring angles?
13. Explain the significance of error bars in graph plotting.
14. Comment on the statement “Error is an unavoidable evil”.
15. Write a short note on working of water clock
16. Distinguish between theory and hypothesis. (6 x 2 = 12 marks)

Part C
Problems/Derivations

(Answer **four** questions. Each question carries 5 marks.)

17. An observer at rest watches a meter scale moving with a velocity 0.7c. Calculate the length measured by the observer.
18. Calculate the band gap of a semiconductor diode which emits blue light of wavelength 470nm.
19. A galvanometer has a resistance of 50Ω. The current required for the galvanometer to show full scale deflection is 2mA. Explain how it can be converted to a voltmeter to measure voltages in the range 0 - 10 V.
20. Explain the need for peer review.
21. The mass and length of a cube are 2.05 $\pm$0.05 gm and 1.235$\pm$0.005 cm respectively. Determine density of the cube (in SI system) with correct significant figures. Also find the uncertainty in density.
22. The following readings are taken of a certain physical length using a screw gauge (in mm) 2.21, 2.27, 2.26, 2.24, 2.22, 2.25 and 2.29. Assuming that only random errors are present calculate the (i) arithmetic mean (ii) average deviation (iii) standard deviation and (iv)variance.

(4 x 5 = 20 marks)

Part D
Long Answer questions

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

23. Explain the contribution of Saha and Chandrasekhar towards physics.
24. Explain the working of (i) pendulum clock (ii) atomic clock and (iii) digital clock. Briefly comment the merits and demerits of each.
25. What is meant by significant figure? Explain with examples the rules used to determine the significant figures.
26. What is an error? Explain absolute error, mean error and percentage error. Discuss the combination of errors in various cases.

(2 x 10 = 20 marks)