Reg. No……..…….………………Name……………...……………..……

BSc DEGREE EXAMINATION - OCTOBER 2015

SEMESTER: 1 - PHYSICS (CORE)

COURSE 1- U1CRPHY1: METHODOLOGY IN PHYSICS

(Supplementary / Improvement)

Time: Three Hours   Max. Marks: 60

Part A

(Very short Answer questions. Answer **all** questions.
Each question carries 1 mark.**)**

1. Explain the concept of geocentric   and Helio centric theories of the universe.

2. What are the basic forces in nature?

3. Explain Chandrasekhar limit.

4. Explain Raman Effect.

5. What is the principle of SONAR?

6. How parallax error is minimized?

7. Determine the number of significant figures in (i) 4.005 (ii) 4500 and (iii) 0.004005

8. What is meant by dominant error?   (1 x 8 = 8)

Part B

(Very short Answer questions. Answer **six** questions.
Each question carries 2 marks.)

9. What are the postulates of special theory of relativity?

10. What are the advantages of peer review process?

11. Write the Maxwell's equations in electromagnetism.

12. In any electrical circuit ammeter is connected in series and voltmeter is connected in

    parallel. Why?

13. What are the advantages of scale and telescope arrangement in measuring angles?

14. What are the various methods for calibration?

15. Write a short note on working of an atomic clock.

16. Distinguish between repeatability and reproducibility.

                                                                                    (2 x 6 = 12)

Part C

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

17. Calculate the length of a meter scale in a frame which is moving with a velocity 0.9c.

18. Calculate the band gap of a semiconductor diode which emits red light of wavelength 670nm.

19. A galvanometer has a resistance of 50 Ω. The current required for the galvanometer to show full scale deflection is 2mA. Calculate the shunt resistance requited to convert it to an ammeter for measuring currents in the range 0- 10 A.

20. Explain the need for patent.

21. The length and width of a rectangular plate are $10\pm0.0.05$cm and $7\pm0.0.01$ cm respectively. Calculate the area and uncertainty in area.

22. The time period of a simple pendulum was measured a stop watch. The following readings were obtained (in seconds): 1.02, 1.01, 1.07, 1.05, 1.03 and 1.04. Calculate
    (i) Mean value of length
    (ii) Absolute error in each measurement and
    (iii) Percentage error.   (5 x 4 = 20)

Part D

(Long Answer questions. Answer **two** questions.
Each question carries 10 marks.)

23. Explain the contribution of Albert Einstein and Max Plank in the development of modern physics.

24. Explain two methods to determine (i) time (ii) length and (iii) angle. Briefly comment the merits and demerits of each method.

25. Explain Standard deviation. Discuss error bars and graphical representation.

26. Explain the principle of a galvanometer. How it can be converted to
    (i) An ammeter and
    (ii) Voltmeter.   (10 x 2 = 20)

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