THIRD SEMESTER B.Sc. DEGREE EXAMINATION NOVEMBER 2010

(CCSS)

Physics – Complementary Course

PH 3C 05 – OPTICS, LASER ELECTRONICS AND COMMUNICATION

Time : Three Hours   Maximum Weightage : **30**

I. Answer all the *twelve* questions :

1. 'The ray will correspond to that path for which the time take use an extremum in comparison to nearby paths' – Which law is this?

    (a) Law of reflection.   (b) Fermat's principle.

    (c) Brewster's law.   (d) De-morgan's theorem.

2. Colours of thin film are due to _____

3. In Fraunhofer diffraction the source and screen are at   distances from the aperture.

    What kind of sources are used to get interference pattern?

5. Write down the equation for resolving power of a grating.

6. When an unpolarized light is passed through a Polaroid, what kind of light is obtained?

7. The spreading out of wave when it passes through a narrow opening is called——————

8. The essential parts of an astronomical telescope are _____ and ____

9. A transistor has ———— number of PN junction diodes.

10. Voltage gain of an amplifier is the ratio ——————————

11. In RC couple amplifier the voltage gain over mid frequency ranged is

12. A.C. load line is ———— than d.c. load line.——

(12 x ¼ = 3 weightage)

II. Answer all the *nine* questions :

13. What is meant by constructive interference?

14. What are the conditions to produce interference?

15. What is a zone plate?

16. Write different methods to produce polarized light.

17. What is population inversion?

18. What is optical activity?

19. Draw the ray diagram for the image formation in a Galielan telescope.

20. Name the three possible transistor connections.

21. Explain Bandwidth.

(9 x 1 = 9 weightage

III. Answer any *five* from seven questions :

22. In Newton's ring arrangement, the radius of curvature of the curves side of the Plano conv lens is 100 cm. For $\lambda = 6 \times 10^{-5}$ cm. What will be the radius of 9th and 10th bright fringe?

23. Distinguish between Fresnel and Fraunhofer diffractions.

24. What will be the Brewster angle for a glass slab (n = 1.5) immersed in water (n = 4,3).

25. Discuss relative advantages and disadvantages of Huygen's and Ramsden's eyepieces.

26. The applied input a.c. power to half wave rectifier is 100 watts. The D.C. output power obtain is 40 w.

    (a) What is the rectifier efficiency?

    (b) What happens to remaining 60 watt?

27. Write a brief note on Ruby laser.

28. Write a note on different kinds of filter circuits with examples.

(5 x 2 = 10 weightage

IV. Answer any *two* questions from three :

29. Explain the interference by a plane parallel film when illuminated by a point source.

30. Briefly explain Fraunhofer single slit diffraction pattern.

31. Explain LC and RC oscillators with neat diagram, explain the circuit operation of a Hai Oscillator.

(2 x 4 = 8 weightage