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72402 **(Pages : 2)** **Name**.....

Reg. No.....

THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2014

(UG-CCSS)

Complementary Course—Physics

PH 3C 05—OPTICS, LASER, ELECTRONICS AND COMMUNICATION

(2009–2012 Admissions)

me : Three Hours Maximum : 30 Weightage

Part A

Answer **all** *questions.*
Each question carries ¼ weightage.

1. No real light source emits ——— electromagnetic waves.
2. Coherent waves are ———.
3. For constructive interference to take place between two monochromatic light waves of wavelength λ the path difference should be ———.
4. To observe diffraction, the size of obstacle must be ———.
5. A diffraction pattern is obtained using a beam of red light. What happens if the Red light is replaced by blue light :
   (a) No change.
   (b) Diffraction bands become narrower and crowded together.
   (c) Bands become broader and farther apart.
   (d) Bands disappear.
6. Diffraction fringes are ——— width.
7. Optically active substance are those which ———.
8. A laser is a ——— source.
9. A Zener diode has a ——— in the breakdown region.
10. Voltage divider bias operates in the :
    (a) Active region. (b) Cut-off region.
    (c) Saturation region. (d) Breakdown region.
11. An AND gate is equivalent to a ———.
12. A Colpitts oscillator uses :
    (a) Tapped coil. (b) Inductive feedback.
    (c) Tapped capacitance. (d) No tuned LC circuit.

(12 × ¼ = 3 weightage)

Turn over

Part B

Answer **all** *questions.*
Each question carries 1 *weightage.*

13. Give two comparisons of Newton and Galilean telescopes.
14. How can Coherent sources be obtained in practice ?
15. Why is a soap bubble or thin film of oil spread over the surface of water appear coloured sunlight ?
16. Explain the phenomenon of diffraction.
17. Explain why a graying is designed to produce only two orders.
18. Distinguish between polarized and unpolarized light.
19. What is Population Inversion ?
20. Draw the circuit of a full wave rectifier.
21. What is an optical fiber ? How does it work ?

(9 × 1 = 9 weighta

Part C

Answer any **five** *questions.*
Each question carries 2 *weightage.*

22. State and explain Fermat's principle of extremum path. Give an example where the path of li is a relative maximum.
23. What is a biprism ? In a biprism experiment the edge piece is placed at a distance of 1.2 m. fr the source. The distance between the virtual sources is 7.5×10^{-4} m. Find the wavelength of li if the eyepiece is moved transversely through a distance of 1.888 cm. for 20 fringes.
24. What are Fresnel half period zones ? What is the radius of the first half period zone in a zone pl behaving like a convex lens of focal length 0.6 m. for light of wavelength 6000 Å.
25. Give the construction and working of a Nicol Prism. How is it used as an analyzer ?
26. Explain the working of a Huygen's eyepiece. Why is it called a negative eyepiece ?
27. Explain the principle and working of a He-Ne laser.
28. Explain the working of a Hartley oscillator.

(5 × 2 = 10 weighta

Part D

Answer any **two** *questions.*
Each question carries 4 *weightage.*

29. What are Newton's rings ? How would you obtain Newton's rings with bright center ? Describe experiment to determine the wavelength of sodium light using Newton's rings.
30. What is a plane diffraction grating. Describe with theory how the wavelength of light is determi using a grating.
31. Explain the construction and working of a CE amplifier. Draw the frequency response. Wha bandwidth ? What are the merits of negative feedback ?

(2 × 4 = 8 weighta