SUBJECT CODE : 11PH/MC/OS44

B.Sc. DEGREE EXAMINATION APRIL 2015
BRANCH III - PHYSICS
FOURTH SEMESTER

REG. No._____

COURSE : MAJOR – CORE
PAPER : OPTICS AND SPECTROSCOPY
TIME : 30 MINS. MAX. MARKS : 30

TO BE ANSWERED IN THE QUESTION PAPER ITSELF
SECTION – A

ANSWER ALL QUESTIONS: (30 x 1 = 30)
I Choose the Correct Answer:

1. The unit of power is called
   a) diopter   b) watt   c) Hz   d) pound

2. Astigmatism similar to coma is called
   a) aberation   b) distortion   c) defect   d) error

3. If the dispersion through a prism does not follow the order given by VIBGYOR, it is said to be
   a) anamalous dispersion   b) Clear dispersion   c) dispension   d) micro dispension

4. In Newtons rings the central ring is
   a) dark   b) bright   c) zero   d) n

5. The magnifying power of telescope is
   a) D/d   b) d/D   c) D   d) d

6. $\mu = \dfrac{\sin i}{\sin r}$ is called
   a) Refractive index   b) Refractive power   c) Refract   d) Reciprocal

7. The radius of dark ring is proportional to _____
   a) $\sqrt{nR\lambda}$ b) $n\sqrt{R\lambda}$ c) $R\sqrt{n\lambda}$ d) $nR\lambda$

8. For a thin lens the nodal points coincide with
   a) optic axis   b) optic centre   c) nodal planes   d) focal point

9. The number of cardinal points in a line is
   a) 8   b) 6   c) 4   d) 2

10. An air bubble inside water behaves as a
    a) convex lens   b) concave lens   c) plano convex lens   d) plano concave lens

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11. Inter ference in thin film is due to
    a) transmitted light   b) reflected light   c) both   d) refracted light

12. Fresnel and Fraunoffer diffraction differ by _____
    a) wavelength of incident light   b) position of source screen
    c) coherent incident beams   d) frequency of incident light

13. An example of uni axial crystal is _____
    a) quartz   b) calcite   c) both   d) carbon

14. Electronic spectro of molecules are found in _____
    a) microwave region   b) visible and UV region
    c) IR & far IR region   d) IR and microwave region

15. Wave length range of visible spectra is _____
    a) $4000 - 1000\ A^o$ b) $8000 - 400\ A^o$ c) $6000 - 4000\ A^o$ d) $600 - 400\ A^o$

II   Fill in the blanks:

16. Nichol prism is used as polariser and _____.

17 Sugar solution is an _____ active substance.

18. The Bandwidth β in young's double slit experiment is _____ .

19. Bending of waves is called _____.

20. Spectrometer consists mainly of   a) collimator   b) prism table   c) _____

III   State whether True or false:

21. $1/f$ = power

22. Light travels in straight lines.

23. Condition for thin film formation is $2\mu t \cos r = n\lambda$.

24. Telescope has eyepiece of shorter focal length and objective of longer focal length.

25. Biaxial crystals has one ordinary ray and 2 extraordinary ray.

IV   Answer briefly:

26. State FERMAT'S Principle.

27. Define power of lens.

28. What is Interference?

29. Define zone plate.

30. Define resolving power.

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COURSE	:	**MAJOR – CORE**
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TIME	:	**2 ½ HOURS**

MAX. MARKS : 70

SECTION – B

Answer any FIVE of the following: (5 x 5 = 25)

1. Two thin converging lenses of power 5 diopters and 4 diopters are placed co-axially 10cm apart. Find the focal length of combination.

2. Calculate the dispersive power for crown and flint glass from following data.

	C	D	F
Crown	1.5145	1.5170	1.5230
Flint	1.6444	1.6520	1.6637

3. A soap film of refractive index 4/3 and of thickness 1.5×10^{-4}cm is illuminated by white light incident at an angle of 60°. The light reflected by it is examined by a spectroscope in which is found a dark band corresponding to wavelength of 1.5×10^{-5}cm calculate order of interference of dark band.

4. What is the highest order spectrum, which may be seen with monochromatic light of wavelength 6000 A$^{\circ}$ by means of diffraction grating with 5000 lines/cm.

5. A 20 cm tube containing sugar solution rotates the plane of polarisation by 11°. If the specific rotation of sugar is 66°, calculate the strength of solution.

6. Explain classical theory of Raman Effect.

7. Explain IR spectrophotometer.

SECTION – C

Answer any THREE of the following: (3x15 =45)

8. Give the construction and working of Ramsden's eyepiece.

9. Explain working of Michelson's interferometer. How is wavelength of monochromatic source determined?

10. Explain plane transmission grating and determine wavelength of light.

11. Define optical activity. How is optical activity determined by polarimeter.

12. Write note on ultraviolet and visible spectroscopy.

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