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Roll No. .....

TPH–101/102

B. TECH. (FIRST SEMESTER)
MID SEMESTER EXAMINATION, 2019

(CS AND NON-CS BRANCH)

ENGINEERING PHYSICS

Time : 1 : 30 Hours

Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks : (1×5=5 Marks)

   (a) Resolving power of grating is given by .....

   (b) The specific rotation of sugar solution is .....

   (c) In reflected light the central fringe of Newton's ring is .....

   (d) In Fresnel diffraction, source of light is kept at ..... distance from the aperture.

   (e) Colours in thin films are because of .....

2. Attempt any *five* parts : (3×5=15 Marks)

(a) What are the coherent sources ? State the essential condition for sustaining the interference phenomenon of light.

(b) What is the difference between Fresnel and Fraunhofer diffraction ?

(c) What is meant by the resolving power of an optical instruments ? Explain Rayleigh criterion for just resolution.

(d) In a biprism experiment using light of wavelength 589 nm, 30 fringes are observed in the field of view. If this light is placed by light of wavelength 440 nm. Calculate how many fringes are observed in the field of view.

(e) What do you mean by dispersive power of grating ?

(f) Define the terms spontaneous and stimulated emission of radiation.

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Describe the construction, theory and working of Fresnel's biprism experiment to find the wavelength of the light.

(b) Newton's rings are observed by keeping a spherical surface of 1-metre radius on a plane glass plate. If the diameter of the 20th bright ring is 0.560 cm and the diameter of the 10th ring is 0.360 cm, what is the wavelength of light used ?

(c) Describe Fraunhofer diffraction due to single slit and deduce the position of the maxima and minima.

4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) Explain briefly, why Newton's ring are circular. Prove that in reflected light the diameter of the dark ring is proportional to the square root of the natural number.

(b) Calculate the thickness of a half wave plate and quarter-wave plate of quartz for sodium light of wavelength 586 nm. The refractive indices of quartz for ordinary and extraordinary rays are 1.542 and 1.556 respectively.

(c) How many orders will be visible if the wavelength of incident radiation is 6000 Å and the number of lines on the grating is 2600 to an inch ?

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)

(a) What is specific rotation ? Describe the construction, theory and working of half-shade polarimeter to find the specific rotation of sugar solution and also discuss the action of half-shade plate in it.

(b) A polarimeter tube 20 cm long and containing sugar solution of unknown strength, it is found that the plane of polarization is rotated though 10°. Find the strength of the sugar solution in g/cm^3. Here specific rotation of sugar solution is 66°.

(c) Explain with the help of a neat diagram the principle, construction and working of He-Ne laser.