

Total No. of printed pages = 3

PH 171201

218/22

Roll No. of candidate

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2022

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Azara, Hatkhowapara,
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B.Tech. 2nd Semester End-Term Examination

ENGINEERING PHYSICS - II

(New Regulation)

Full Marks - 70

Time - Three hours

The figures in the margin indicate full marks
for the questions.

Answer question No. 1 and any *four* from the rest.

1. Select the correct option : (10 × 1 = 10)
- (i) Chromatic aberration is a defect caused by
- (a) single wavelength (b) multiple wavelengths
- (c) shape of the mirror (d) none of these
- (ii) Diffraction of light occurs when the size of the obstacle is
- (a) greater than the wavelength used
- (b) smaller than the wavelength used
- (c) comparable to the wavelength used
- (d) all of these
- (iii) Induced emf comes into play when the circuit is
- (a) switched on (b) switched off
- (c) both options (a) and (b) (d) none of these
- (iv) In case of an LCR circuit, charges begin to accumulate in the condenser plates during
- (a) growth of current (b) decay of current
- (c) only after growth (d) only before decay

[Turn over

- (v) Coherent photons are produced during
- (a) spontaneous emission (b) induced absorption
- (c) stimulated emission (d) all of these
- (vi) Light travels in an optical fibre due to
- (a) interference (b) diffraction
- (c) polarization (d) total internal reflection
- (vii) LED is a
- (a) forward biased PN junction (b) reverse biased PN junction
- (c) zero biased PN junction (d) none of these
- (viii) Meissner's effect proves that a superconductor is
- (a) paramagnetic (b) ferromagnetic
- (c) ferrimagnetic (d) diamagnetic

(ix) Gradient of a scalar function is a

- (a) vector
- (b) scalar
- (c) can be either a vector or a scalar
- (d) none of these

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(x) The equations which are the basics to understand electromagnetic theory are

- (a) Einstein's equations (b) Helmholtz equations
- (c) Carnot's equations (d) Maxwell's equations

2. (a) What is spherical aberration? Briefly discuss, how it can be minimized by using stops. (2+3=5)
- (b) Find the expression of longitudinal chromatic aberration. Dispersive power of a crown and flint glasses are 0.2 and 0.4 respectively. Find the focal length of the two component lenses of the combination in contact forming achromatic doublet if the combination has the focal length of 20 cm. (5+5=10)
3. (a) Define diffraction of light. Write a few differences between Fresnel's and Fraunhofer classes of diffraction. (2+3=5)
- (b) Explain the intensity distribution in single slit diffraction. (10)

4. (a) Explain the growth of current in an LR circuit. Draw the curves of both growth and decay and explain in brief. (7+3=10)
- (b) In an oscillatory circuit, $L = 0.2$ henry, $C = 0.0012\mu\text{F}$. What is the maximum value of resistance for the circuit to be oscillatory? (5)
5. (a) With circuit diagram, explain the different biasing in PN junction diode. Describe the working of a solar cell. (6+4=10)
- (b) Write few properties of superconductors. What are Type-I and Type-II superconductors? (2+3=5)
6. (a) What is Del operator? Write the physical significance of divergence of a vector field. Write the Maxwell's equations. (2+2+2=6)
- (b) Derive continuity equation. Write few differences between conduction and displacement current. (6+3=9)