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Total Number of Pages: 02

B.Tech
BS1102

1ST SEMESTER BACK EXAMINATION 2017-18
PHYSICS-I

BRANCH: AEIE, AERO, AUTO, BIOTECH, CHEM, CIVIL, CSE, ECE, EEE, EIE,
ELECTRICAL, ETC, FASHION, IEE, IT, MECH, METTA, MME, PE, TEXTILE

Max Marks: 70

Time: 3 Hours

QCODE: B934

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Q.1 Answer the following questions: [2 x 10]

- a) What are free and forced oscillations?
- b) What is the principle of superposition?
- c) What is the Interference? Write the types of Interference.
- d) Define grating element of a diffraction grating.
- e) What is a quarter wave plate?
- f) State Maxwell's equations in a medium having no charge and no current.
- g) What is Lorentz gauge condition?
- h) What is pair production?
- i) State Wien's displacement law.
- j) What is meant by Quantum mechanical tunneling?

Q.2 a) Set up the differential equation of a forced oscillator subjected to an external force. [5]

b) Mention the similarities and difference between a converging lens and a zone plate. [5]

Q.3 a) What are Fresnel's half period zones? [3]

b) Explain the factors on which the intensity at a point due to Fresnel's half period zones depend? [7]

Q.4 a) What is meant by polarization of light. How polarization is produced by reflection. [5]

b) State Brewster's law. [5]

Q.5 a) Prove that the curl of gradient of a scalar field is zero and divergence of curl of a vector field is zero. [5]

b) Show that the electromagnetic waves are transverse in nature. [5]

Q.6 a) Derive the time independent Schrodinger's equation for one dimensional system. **[6]**

b) Hence find out the energy of a free particle? **[4]**

Q.7 a) What is a one-dimensional potential step? **[2]**

b) Derive the Schrödinger equation for a particle in a potential box of infinite depth. **[8]**

Q.8 Write short answer on any two: **[5 x 2]**

a) Coupled oscillation.

b) Zone plate.

c) Poynting theorem.

d) Compton shift.