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KOUL

EH-160
B.E. Ist Semester (CGPA) Elect. & Commun. Engg.
Examination, 2019
Engg. Physics
Paper - EL - 101

Time : 3 Hours]

[Maximum Marks : 60

Note :- All questions are compulsory. All questions carry equal marks.

1. Choose the correct answer : 10

(i) Which of the following is not the property of photons ?

- (a) Momentum
- (b) Energy
- (c) Frequency
- (d) Rest Mass

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(1)

P.T.O.

(ii) The bending of light rays round the corners of an obstacles is called :

- (a) Interference
- (b) Diffraction
- (c) Dispersion
- (d) Polarization

(iii) At low temperature if the resistivity of a metal vanishes, then it is a :

- (a) Conductor
- (b) Superconductor
- (c) Dielectric
- (d) Insulator

(iv) Active centre in Ruby laser is -

- (a) Al
- (b) Cr⁺
- (c) O₂
- (d) Al₂O₃

(v) Pure dielectric medium is a :

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(2)

- (a) Conductor
- (b) Insulator
- (c) Semiconductor
- (d) None of these

2. (a) Derive an expression for radius of dark rings in Newton's ring experiment.

5

OR

Obtain an expression for Maxima and minima due to diffraction of light by a single slit.

(b) Explain Rayleigh criterion and find cut the resolving power of a telescope.

OR

How Nicol prisms can be used as polarizer and analyzer?

3. (a) Establish the relation between group velocity phase velocity and particle velocity.

OR

X-ray of 0.5\AA are scattered by the electrons in a block of carbon through 90° . Find the wavelength of scattered photon.

(3)

- (b) State time independent Schrodinger wave equation for particle.

5

OR

Explain three and four level pumping schemes used in laser action.

4. (a) Describe the construction and Working of a cyclotron.

5

OR

Give the principle and working of a betatron.

(b) A Cyclotron oscillator frequency of 1MHz is used to accelerate protons. If the radius of the dees is 60 cm, find the magnetic field.

5

OR

Explain the liquid drop model of nucleus and point out the similarities between liquid drop and nucleus of an atom?

5. (a) Explain the Hall effect in a conductor.

OR

What is a PN-Junction diode? How it is formed?

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(4)

(b) What is meissner effect ? Distinguish between type I and type II superconductors.

OR

Write short notes on Solar Cell.

6. (a) Derive the inter relationship between E , D and P vectors. Draw lines as force diagram for them. 5

OR

Derive the clausius-Mossotti relation in dielectrics.

(b) Explain dielectric loss obtain expression for loss angle and loss tangent.

OR

Is it possible to estimate the ionic polarizability of germanium if it has 4.42×10^{28} atoms/m³ and a dielectric constant to 16?

