Total No. of printed pages = 4

19/3rd Sem/UPH301

2021

APPLIED PHYSICS

Full Marks – 100

Time – Three hours

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

Answer any *five* questions.

1. (a) Write down the Maxwell's four Electromagnetic equations and their physical significances. 8

   (b) Estimate the velocity of electromagnetic wave propagating in free space. 6

   (c) What is displacement current ? Write the corrected Maxwell equation. 6

2. (a) What is Optical fibre ? Write some of its applications. 6

   (b) Define acceptance angle and numerical aperture of the optical fibre. 6

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(c) Compute the numerical aperture and the acceptance angle of an optical fibre from the following data. n_1 (*core*) = 1.65 and n_2(*cladding*) = 1.60. 8

3. (a) Explain the Optical Fibre Communication System with block diagram. 8

(b) Write short notes on : 8

(i) Attenuation (ii) Dispersion.

(c) Write the differences between Step Index Fibre and Graded Index Fibre. 4

4. (i) Choose the correct answers : 2×5=10

(a) Can a 1000 Micrometer thick material be called as thin film or not ?

(a) Yes (b) No (c) Uncertain.

(b) The emission of particles from source in DC sputtering takes place using

(a) Heat (b) High voltage (c) Both.

(c) The sputtering process is classified as DC or RF depending on the type of power supply used.

(a) True (b) False (c) Uncertain.

(d) In sputtering, the entire surface of the target is the source, unlike evaporation process where a point (where electron beam hits) on the target is the source.

(a) True

(b) False

(c) Uncertain

(e) The X-ray diffraction technique is used to study

(a) the phase purity

(b) the crystal structure

(c) None of the above

(ii) What is Ferroelectricity ? What are the parameters which can be extracted from P-E measurements ? 5+5=10

5. (a) Write down the merits and demerits of various deposition techniques. 5

(b) Write a short note on DC sputtering techniques and its working principles. 5

(c) Write a note on the working principles of Scanning Electron Microscope (SEM). 5

(d) Write a short note on working principles of XRD. 5

6. (a) What are Ferromagnetic Materials ? 5

(b) What is the difference between Spontaneous and Saturation Magnetization ? 5

(c) What is Curie Temperature ? How it is determined ? 5+5-10