

Total No. of printed pages = 4

19/3rd Sem/UPH301

2021

APPLIED PHYSICS

Full Marks – 100

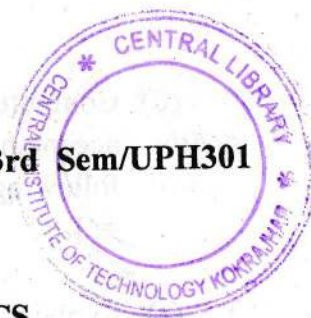
Time – Three hours

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

Answer any *five* questions.

1. (a) Write down the Maxwell's four Electro-magnetic 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

[Turn over





- (c) Compute the numerical aperture and the acceptance angle of an optical fibre from the following data. $n_1(\text{core}) = 1.65$ and $n_2(\text{cladding}) = 1.60$. 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 : $2 \times 5 = 10$
- (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



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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

