

2. What is MIS diode ? Show its energy band diagram and discuss Ideal MIS curves.

Or

Explain construction and working of Gun diode with characteristics.

3. What is electrostrictive and magnetostrictive effect ? Explain their applications in sensors and actuator devices.

Or

Explain electro-optic effect. Discuss materials showing this effect and how these materials are used to make sensors.

4. What is SSB modulation ? Explain generation and detection of SSB waves.

Or

Define different types of modulation and obtain mathematical expression for modulations.

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M.Sc. I Semester Examination, April-2021

PHYSICS

Paper IV

(Electronic Devices)

Time : 3 Hours]

[Maximum Marks : 80

Note : All questions are compulsory. Question Paper comprises of 3 sections. **Section A** is objective type/Multiple Choice questions with no internal choice. **Section B** is short answer type with internal choice. **Section C** is long answer type with internal choice.

SECTION 'A'

(Objective Type Questions)

Choose the correct answer :

1 × 8 = 8

1. The relation between β and α is :

(a) $\beta = \frac{1}{1-\alpha}$

(b) $\beta = \frac{1-\alpha}{\alpha}$

(c) $\beta = \frac{\alpha}{1-\alpha}$

(d) $\beta = \frac{\alpha}{1+\alpha}$

2. Which of the following devices has the highest input impedance :

(a) JFET

(b) MOSFET

(c) Crystal diode

(d) Transistor (PNP or NPN)

3. In CCD, change at output is detected when P-N Junction in it is :

(a) Forward biased

(b) Reverse biased

(c) In both (a) and (b)

(d) None of these

[2]

4. To make a pressure-sensor, which property of material is useful :

- (a) Magnetostrictive property
- (b) Ferroelectric property
- (c) Piezoelectric property
- (d) Magetooptic property

5. In electro-optic effect, applied electric field is corated with which property of material :

- (a) Transperancy (b) Dielectric property
- (c) Refractive index (d) Reflection property

6. A Tunnel diode is always biased :

- (a) by the source
- (b) In the middle of its negative resistance region
- (c) In the positive resistance region nearest zero
- (d) In the Inverse direction

7. In AM, Power content of the carrier is maximum when m equals to :

- (a) = 0 (b) = 1
- (c) = 0.8 (d) = 0.5

8. An SSB-SC signal contains 2kW. The power contained in carrier is :

- (a) 0.66 kW (b) 2 kW
- (c) 0 kW (d) 1.5 kW

[3]

SECTION 'B'
(Short Answer Type Questions)

6 × 4 = 24

Note : Answer the following questions in 250 words.

1. Explain the operation of PNP.Transistor in CE mode and describe input and output characteristics.

Or

Explain V-I characteristics of UJT and important parameters.

2. Discuss static and dynamic characteristics of IMPATT diode.

Or

Explain working of Backward diode.

3. Write short notes on Piezoelectric resonators.

Or

Discuss Acousto-optic effect with materials showing this property.

4. Explain Frequency division multiplexing (FDM) in brief.

Or

Discuss demodulation amplitude modulated wave.

SECTION 'C'
(Long Answer Type Questions)

12 × 4 = 48

Note : Answer the following questions in 500 words.

1. Explain construction, working and characteristic curves for JFET.

Or

Explain construction and working of DE-MOSFET.