* D J - 0 0 3 - 0 0 1 4 0 2 *

DJ-003-001402 Seat No. _____

B. Sc. (Sem. IV) (CBCS) Examination

March – 2022

Optics-Laser Electronics

(Old Course)

Faculty Code : 003

Subject Code : 001402

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Symbols hare their usual meaning
(3) Figures of the right indicate marks.

1 Give answer of the following objective question : **20**

(1) How many types of Diffraction are there? Give the name of diffraction.
(2) The area of the zone depends on wavelength. (True/False)
(3) Give the name of excited states with longer life time.
(4) Ruby laser is a _____ laser.
(5) He-Ne Laser is a gas laser. (True/False)
(6) Refractive index of core is less than the refractive index of cladding. (True/False)
(7) A JFET is also called unipolar transistor. (True/False)
(8) Negative feedback is necessary for obtaining oscillations. (True/False)
(9) Give the name of electronic device which converts DC in to AC.
(10) How many types of modulation are there?
(11) The speed of modulated radio wave in the space is $3x10^8$m/s. (True/False)
(12) What is the range of audio frequency?
(13) Electrons and holes both are responsible for conduction process in ordinary transistor. (True/False)

(14) Field effect transistor (FET) is _____ control device. (Voltage/Current)
(15) What is the full form of JFET?
(16) Write the combination of NAND gate.
(17) Draw the circuit symbol of NOR gate.
(18) Give the names of universal logic gates.
(19) What is the full form of "LDR"?
(20) Solar cell converts the solar light energy in to the electric energy. (True/False)

2 (A) Answer the following : (Answer Any Three) **6**

(1) What is plane diffraction grating?
(2) Write difference between Fresnel diffraction & Fraunhofer diffraction.
(3) What is pumping in laser?
(4) What is LC Oscillators?
(5) Define the RC Oscillators?
(6) What is Optical fiber?

(B) Answer the following : (Answer Any **Three**) **9**

(1) Discuss: The theory of zone plate.
(2) Give comparisons between a zone plate and convex lens.
(3) Write a short note on optical fiber sensors.
(4) State the advantage and disadvantages of Wein Bridge oscillator.
(5) Describe the Barkhausen criterion.
(6) Give the advantage of optical fiber.

(C) Answer the following : (Answer Any **Two**) **10**

(1) Give the theory of Fraunhofer diffraction at double slit (Geometry method)
(2) Explain "population inversion" in the production of "Laser".
(3) Explain the construction and working of ruby laser.
(4) Derive an expression for acceptance angle of the optical fiber.
(5) Derive the Einstein relationship.

3 (A) Answer the following : (Answer Any **Three**) **6**

(1) Define frequency modulation.
(2) What are carrier waves?
(3) What are the types of FET?
(4) State the advantage of UJT.
(5) Draw the circuit diagram of OR gate using diode.
(6) Give the uses of solar cell.

(B) Answer the following : (Answer Any **Three**) **9**

(1) Explain amplitude modulation.
(2) Explain the output characteristics of JFET.
(3) Describe binary number system.
(4) Discuss the construction of "FET" with figure.
(5) Describe "AND" gate with truth table.
(6) Write a short note on photo transistor.

(C) Answer the following : (Answer Any **Two**) **10**

(1) Draw the circuit of AM modulation by using transistor, Discuss its construction and working.
(2) Explain the process involved in radio broadcasting, transmission and reception.
(3) Explain universal gates.
(4) Write a note on solar cell.
(5) Write a note on thermistor.
