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

March / April - 2017

Physics : Paper-401

(Optics, Laser & Electronics)

(New Course)

Faculty Code : 003
Subject Code : 001402

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

Instructions : (1) All questions are compulsory.

(2) Figures on right side indicates full marks.

SECTION – A

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

(1) The area of each half period zone is equal to _____.

(2) _____ are important for analysics of Fresnel diffraction.

(3) The area of the zones depends on wave length.
[True or False]

(4) Ruby laser is a _____ laser.

(5) He-Ne laser is a _____ laser.

(6) _____ laser was made by RN Hall in 1962.

(7) P-N juction diode operated in _____ region.

(8) Optical fibres are based on the principle of _____.

(9) To obtain high frequency _____ network is used.

(10) A single RC network produces _____ degree phase-shift.

(11) In amplitude modulation, the audio signal is transmitted at _____ frequency.

(12) How many types of modulation ?

(13) What is range of audio frequency ?

(14) Electrons and holes both are responsible for conduction process in ordinary transistor. [True or False]

(15) JFET is also called unipolar transistor. [True or False]

(16) A MOSFET can be operated with negative gate voltage only. [True or False]

(17) What is full form of MSD in binary number system.

(18) Convert the decimal number 23 to its equivalent binary number.

(19) What is the full form of LDR.

(20) Solar cell converts the solar light energy into the _____.

SECTION – B

2 (A) Answer the following : (answer any **three**)   6

   (1) Discuss : Fraunhoffer diffraction.

   (2) What is plane diffraction grating ?

   (3) What is pumping in laser ?

   (4) In an optical fibre, the core material has refractive index 1.43 and refractive index of clad material is 1.40, find propation angle.

   (5) Define the RC oscillators.

   (6) Explain "Feedback" in short.

(B) Answer the following : (answer any **three**)   9

    (1) Discuss : The theory of zone plate.

    (2) In the zone plate of focal length 30 c.m., Find the radius of second zone. (Wave length of light is $6000 \overset{\circ}{A}$)

    (3) Write characteristic of spontaneous emission.

    (4) Define : Pumping process.

    (5) Discuss : About optical fibre.

    (6) State the advantage and disadvantages of Wein Bridge Oscillator.

(C) Write answer : (any **two**)   10

    (1) Give the theory of Fraunhoffer diffraction at double slit.

    (2) Explain "Population inversion" in the production of "Laser".

    (3) Explain the construction and working of Ruby laser.

    (4) Discuss the application of an optical fibre.

    (5) Explain the construction and working of Hartley Oscillator.

3 (A) Answer the following : (answer any **three**)   6

    (1) What is modulation ? Give the types of modulations.

    (2) What do you mean by frequency modulation ?

    (3) Give information about schematic symbol of JFET.

    (4) Give the advantages 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) Explain the equivalent circuit of UJT.

    (4) Describe binary number system.

    (5) Explain OR function with 2 input OR Gate.

    (6) Write short note on eight segment display using LCD.

(C) Write answer : (any **two**) 10

    (1) Explain the process involved in radio, broadcasting, transmission and reception.

    (2) Write short note on :
        (a) Straight radio receiver.
        (b) Superheterodyne receiver.

    (3) Describe the construction and working of JFET.

    (4) Explain universal gates.

    (5) Describe working of photo transistor.

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