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2703N1123

Candidate's Seat No :_____

M.Sc. Sem.-3 Examination

503

Physics

Time : 2-30 Hours] March-2025 [Max. Marks : 70

Q.1 (A) Explain in brief *geostationary satellite orbit.* [07]

(B) Explain in brief the mode of propagation and microwave systems for *wave propagation in free space.* [07]

OR

Q.1 (A) Explain in brief satellite antenna *radiation patterns* and *related beams* for area coverage. [07]

(B) Obtain some relationship of below terms for *Troposphere wave propagation.* [07]
(i) The mode of propagation,
(ii) Radio horizon.

Q.2 (A) What do you understand by an acceptance cone of a fiber? [07]
A step index fiber is made with a core of index 1.50, a diameter of 25μ and a fractional difference index of 0.0007. It is operated at a wavelength of 1.32 μ. Find the cladding index required and approximate number of modes this fiber support. If the same fiber is to be used as single mode system, what modification has to be adopted in the system?

(B) Explain the Rayleigh scattering loss and state how to reduce it? List different between intrinsic and extrinsic fiber losses. [07]

OR

Q.2 (A) Giving simple ray diagram, explain the mode propagation in step index and graded index fiber. Obtain an expression for number of guided modes in a planner optical guide [07]

(B) Discuss the following term briefly. [07]
a) graded index fiber
b) absorption losses in optical fiber
c) hybrid modes

Q.3 (A) Discuss (i) High level languages and (ii) operating systems with necessary schematics. [07]

(B) Draw and discuss (i) traditional block diagram of a computer and (ii) block diagram of a computer with the Microprocessor as CPU. Give examples of Input and Out put devices [07]

OR

Q.3 (A) What is a memory? Give chart of memory classification and discuss EPROM, EE-PROM and flash memory [07]

(B) Discuss (i) Single-board computers and (ii) Medium-size computers [07]

Q.4 (A) What are tri-state devices and buffer? Draw a schematic of tri-state inverters with active high and active low enable lines. Discuss working of 74LS244 and 74LS245 with logic diagrams and truth tables. [07]

(B) Draw a block diagram of 8085 single-board Microcomputer system and [07]

discuss various parts of it.

OR

Q.4 (A) Draw relevant schematics of 8085 MPU pin out and signals. Discuss various signals group. [07]

(B) What is a decoder. Draw schematic of 2-to-4 decoder with active low output and enable line and give functional table of 3 to 8 decoder. Draw a logic diagram of 74LS138 decoder and explain working function of it. [07]

Q.5 Attempt any ***Seven*** questions from the following: (Each question carry ***two*** Marks). [14]

(i) State, Kepler's third law and write its importance.

(ii) How the *super-refraction* and *sub-refraction* occurs in troposphere wave propagation?

(iii) Explain the effects of earth's magnetic field on wave propagating through ionospheric layers.

(iv) Define bending loss of an optical fiber. Write an equation of critical radius of curvature of a fiber.

(v) List difference between meridional rays and skew rays.

(vi) Define numerical aperture (NA) of a fiber. Explain why NA is called the figure of merit of a fiber?

(vii) Draw a logic diagram of 74LS138 encoder.

(viii) Give a functional table of 74LS245 bidirectional buffer

(ix) What is a function of D-flip-flop?

(x) Explain terms: MSI, ASCII

(xi) Explain instructions: CPI, MOV B,A

(xii) What is function of Stack and subroutine?

***** PAPER ENDS*****