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THIRD YEAR (FY) DIPLOMA IN E & TC ENGINEERING (EJ)

SCHEME: I SEMESTER: VI

ALL SUBJECTS AS PER MSBTE CURRICULUM

MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI

Question Bank : SUMMER-2022

(Theory Examination)

Scheme – I
Sample Question Paper

22647

Program Name : **Electronics Engineering Group**
Program Code : **EJ, DE**
Semester : **SIXTH**
Course Title : **Optical Network and Satellite Communication [ONS]**
Marks :**70** **Time:3Hrs.**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following: - **(10 Marks)**

(a) Define:
  i. Elevation angle
  ii. Station Keeping
(b) Draw frequency spectrum of optic fiber communication.
(c) Define critical angle and give its mathematical expression.
(d) List various elements of transponder.
(e) State the reason: Uplink frequency in satellite communication is different from downlink frequency.
(f) List the types of optical switches.
(g) Specify the function of altitude control system.

Q.2) Attempt any THREE of the following: - **(12 Marks)**

(a) Explain the concept that keeps the satellite rotating around the earth.
(b) Describe the various types of fibers classified on basis of variation in the refractive index.
(c) Explain working of GPS system.
(d) With the help of ray diagram explain the concept of Total Internal reflection used in optical fiber.

Q.3) Attempt any THREE of the following. **(12 Marks)**

(a) Justify ,Optical fiber communication is more advantageous .
(b) Explain in detail the frequency allocation used for satellite services.
(c) With help of neat diagram explain the function of optical splitter.
(d) Identify andexplain splicing technique shown in fig 1.

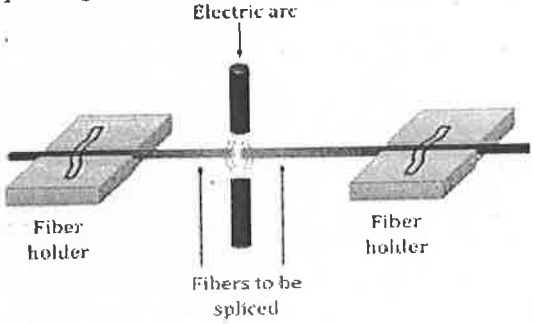

Fig1

Q.4) Attempt any THREE of the following. **(12 Marks)**

(a) Explain the working of satellite transponder.
(b) Draw and explain the working of avalanche photodiode.
(c) Explain radiation losses occurring fiber optic cable.
(d) Identify and explain multiplexing technique shown in fig 2.

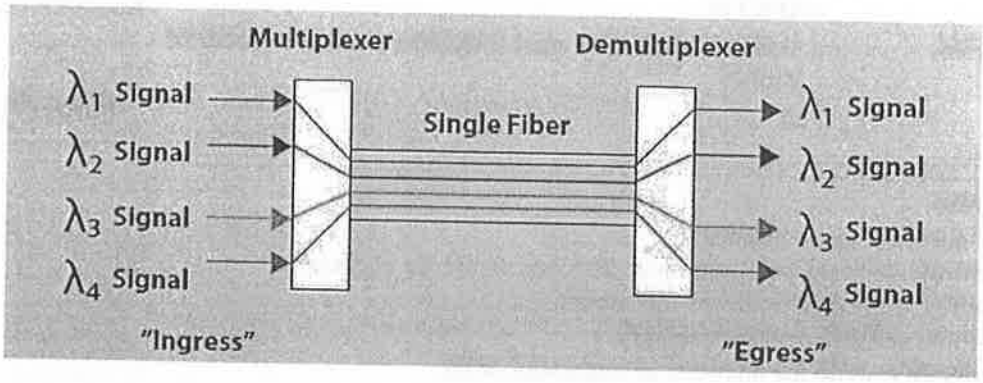

Fig 2

(e) State the working principle of optical switch and give its necessity in optical network.

Q.5) Attempt any TWO of the following. **(12 Marks)**

(a) Describe the effect of non-spherical nature of earth on the orbital inclination of geosynchronous satellite.
(b) Explain SONET/SDH architecture with neat diagram.
(c) State the function of following in satellite.
(i) Propulsion control
(ii) Telemetry and Tracking system
(iii) LNA

Q.6) Attempt any TWO of the following. **(12 Marks)**

a) Explain working principle of VSAT.
b) State two distinguishing features of following Standards:
(i)IEEE 802.3j (ii)IEEE 802.3y (iii)IEEE 802.3z
c) A Silica optical fiber with a core diameter large enough to be considered by ray theory analysis has a core reflective index of 1.50 and a cladding refractive index of 1.47. Calculate:
(i) Critical angle
(ii) Numerical Aperture of fiber,
(iii) Acceptance angle in air for fiber.