SEAT No. :

[Total No. of Pages :3

[4959]-1116

B.E.(Electronics)

OPTICAL AND MICROWAVE COMMUNICATION

(2012 Course) (Elective-III) (404211)(Semester-II)(End Sem)

Time :2½Hours]   *[Max. Marks : 70*

Instructions to the candidates:

1) *Answer Q1 or Q2,Q3or Q4, Q5 or Q6 , Q 7 orQ 8.*
2) *Figures to the right side indicate full marks.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Assume suitable data if necessary.*

Q1) a)   Define fiber splicing. Explain different types of splicing.   **[7]**

b)   Explain 2×2 fiber coupler with performance parameters.   **[7]**

c)   State and explain the desirable properties of a source for optical fiber communication links.   **[6]**

OR

Q2) a)   Explain the construction and working of Silicon reach-through Avalanche Photodiode.   **[7]**

b)   A laboratory demonstration setup has a continuous 12km long optical fiber link that has a loss of 1.5dB/km.   **[7]**

    i)   Compute the minimum optical power level in dB that must be launched into fiber to maintain an optical power level of 0.3 W at the receiving end.

    ii)   Calculate the required input power in dB if the fiber has a loss of 2.5dB/km.

c)   Explain the applications of Fiber Bragg Gratings for multiplexing and demultiplexing function.   **[6]**

P.T.O.

Q3) a) Explain the following waveguide parameters. **[10]**

      i)   Cutoff wavelength

      ii)   Guide wavelength

      iii) Phase velocity

      iv) Wave impedance

      v)   Dominant mode

b) Determine the scattering parameters S_{41}, S_{31}, S_{11} and S_{21} for a 10dB directional coupler having directivity 30dB. Assume that it is lossless and VSWR at each port is 1 under matched conditions. Designate port 1as input port, port 2 as output port, port 3 as back port and port 4 as coupled port. **[8]**

OR

Q4) a) Explain the construction and working of isolator based on Faraday's rotation principle. **[8]**

b) Determine the S matrix of a 3port circulator with insertion loss of 0.5 dB, isolation of 20dB and VSWR of 2. **[6]**

c) State and explain the applications of Magic tee. **[4]**

Q5) a) Explain the need of slow wave structure in TWT. Draw schematic structure of TWT and explain its working. **[8]**

b) Explain the construction and working of cavity magnetron. **[8]**

OR

Q6) a) What are the limitations of conventional tubes at microwave frequencies? **[8]**

b) Draw schematic structure of reflex klystron. Explain its working with the help of apple gate diagram. **[8]**

Q7) a) Explain power frequency limitations of microwave BJT. **[8]**

b) Draw and explain the construction of a microwave BJT. Also explain different types of surface geometries used in it. **[8]**

OR

Q8) Explain the following microwave solid state devices: **[16]**

a) PIN diode

b) Tunnel diode

c) Varactor diode

d) Gunn diode

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