Total No. of Questions : 8]

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SEAT No. :

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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 1 as 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 3 port 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]**

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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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