Total No. of printed pages = 4

Et-603/OFC/6th Sem/2016/N

OPTICAL FIBRE COMMUNICATION

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question Nos.1 and 2 and any *five* from the rest.

1. (a) Fill in the gaps : 1×5=5

(i) Single mode fibre has ——— attenuation.

(ii) A core of large diameter allows ——— modes of propagation.

(iii) In optical transmission system, spreading of pulse width is due to ——— .

(iv) If RI of core and cladding are n_1 and n_2 respectively, then NA is given by ——— .

(v) LASER stands for ——— .

[Turn over

(b) Write true or false : 1×5=5

(i) Single mode fibre transmission system costs less than multimode fibre.

(ii) Single mode fibre system uses laser diode based fibre optic system.

(iii) The RI of core is more than cladding.

(iv) Optical fibre can be made of plastic.

(v) PIN diode is an optical source for fibre communication.

2. (a) If $n_1 = 1.54$ and $n_2 = 1.51$ and light is travelling from higher RI to lower RI, then find θc.

(b) Draw the structure of fibre and label it.

(c) List four advantages of optical fibre over conventional cable.

(d) Classify optical fibre based on modes of propagation and RI profile.

(e) What are the hurdles to optical transmission ? 2×5=10

3. Draw the block diagram of basic fibre optic communication system and explain in brief. Why optical repeater is required ? 8+2=10

4. Draw the RI profile and optical path through different optical fibres and compare them. 6+4=10

5. Draw the schematic cross-section of photo multiplier tube and explain its working principle. 10

6. Compare lasers and LEDs. With a neat structural diagram, explain how LEDs are constructed. 4+6=10

7. What is a coupler ? Name different types of coupler. Describe any one of them with diagram. 10

8. What do you mean by multiplexers and demultiplexers ? What are the different types of optical multiplexing ? Draw the block diagram of TDM and WDM and explain in brief. What does DWDM stand for ? 1+1+7+1=10

9. Write short notes on any *two* : 2×5=10

(a) APD

(b) Application optical fibre

(c) Disadvantage of optical fibre.