



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Tech(ECE)/SEM-1/EC-908/2009-10
2009**

**ADVANCED COMMUNICATION SYSTEM
(ELECTIVE - I)**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP - A

1. Answer any *four* questions : 4 × 5 = 20

- i) What is free space path loss in a microwave communication link ?

Determine the path loss for a signal of 3.4 GHz when it travels through a distance of 20 km. 2 + 3

- ii) What is system gain in a microwave communication link ?

For a microwave link system gain of 150 dB, minimum receiver input carrier to noise ratio of 30 dB and input noise power of -110 dBm. Determine the minimum transmitted power in watt. 2 + 3

- iii) What are the main features of an active integrated antenna ? How it differs from a microstrip patch antenna ? 4 + 1

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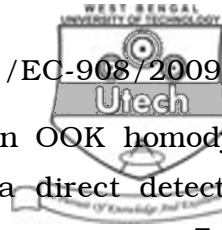


- iv) A 1300 nm laser diode has a temperature dependent frequency change of 15 GHz/°C.
- a) What temperature fluctuation is permitted if the frequency must not change by more than 50 MHz ? 2 + 3
- b) By how much does the wavelength change for this change in temperature ? 2 + 3
- v) What are the advantages and disadvantages of coherent optical communication scheme over direct detection scheme ? 5

GROUP – B

Answer any *five* of the following. 5 × 10 = 50

2. Discuss some important propagation phenomenon that can influence the operation of microwave communication systems. 10
3. Give the block diagram of a satellite transponder system. What do you mean by back-off loss ?
- An earth station satellite transmitter has an HPA with a rated saturated output power of 12 kW. The back-off ratio is 4 dB, branching loss is 1.5 dB, feeder loss is 2.5 dB, antenna gain is 40 dB. Determine EIRP. 4 + 2 + 4
4. Give brief description of
- a) coaxial and
- b) aperture coupled feeding techniques of microstrip patch antennas. Compare these techniques. 8 + 2



5. Describe the principle of operation of an OOK homodyne system. Compare its performance with a direct detection system. 7 + 3
6. Give the basic block diagram of an optical communication link. What are the advantages and disadvantages of optical communication links ? 2 + 8
7. Describe transmission line model of rectangular microstrip patch antennas. State few advantages of microstrip patch antennas. 8 + 2
8. Write short notes on any *one* of the following : 10
- i) PSK homodyne system
 - ii) Cavity model of microstrip antenna.
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