Scheme – I

Sample Question Paper

Program Name	: Electronics & Tele-Communication Engineering, Electronics, Electronics & Communication Engineering, Electronics Engg. and Electronics & Communication Technology
Program Code	: EJ/ET/EN/EX/EQ
Semester	: Third
Course Title	: Principles of Electronics Communication
Marks	: 70

22334

Time: 3 Hrs.

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 the term signal to noise ratio.

 b) Define modulation indexof FM.

 c) Write any one application of thefollowing frequencyrange:
   i. Radio frequency
   ii. IR Frequency

 d) Draw the labeled circuit diagram of ratio detector.

 e) Explain the necessity of de-emphasis circuit used with FM receiver.

 f) List any fourcharacteristics of ground wave propagation.

 g) Sketch theradiation pattern of Yagi-Udaantenna.

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

 a) Draw the basic block diagram of electronic communication system. State the function

  of transmitter.

 b) Explain the function of pre-emphasis circuit with justification.

 c) Compare narrowband FM with wideband FM w.r.to following point

   i. Modulation index

ii. Maximum deviation

iii. Range of modulating frequency

iv. application

d) A 10KWatt carrier is amplitude modulated by two sine to a depth of 0.5 and 0.6 respectively. Calculate total power of modulated carrier.
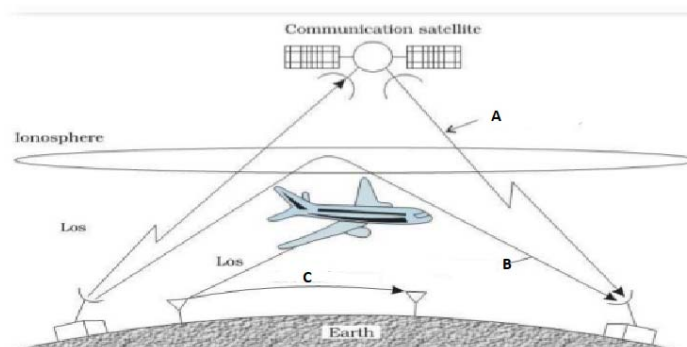
Q.3) Attempt any THREE of the following. **12 Marks**

a) Sketch AM Signalin: - 1.Time domain   2. Frequency domain

b) Explain why reception for High frequency band is better during night time.

c) Compare characteristics of asynchronous and synchronous transmission modes. (Any four points)

d) Explain the working of FM demodulator contains phase lock loop with the help of suitable block diagram.

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

a) Explain the properties of the D, E,F,F_1 layers of ionosphere

b) Justify that all the information of AM wave is contained only in the sidebands, .

c) A super heterodyne radio receiver with an IF of 455 KHz is tuned to thestation operating at frequency 1000 KHz.Calculate the following

i. Image frequency

ii. Local oscillator frequency

d) Identify wave propagation mode for A,B,C shown in the fig.1.and writhe one application of each mode.

e) Sketch structure and radiation pattern of loop antenna.

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

    a) Explain tropospheric scatter propagation with sketch.

    b) i) Derive a mathematical expression for amplitude modulated wave.
      ii)A 400watt carrier is amplitude modulated to a depth of 75%.Calculate the total power in AM Wave.

    c) i) Draw the radiation patterns of following resonant dipole antenna.
      a) $l=\lambda/2$
      b) $l=\lambda$
      c) $l=3\lambda/2$
      d) $l=3\lambda$, where l is length of dipole antenna

      ii) List any two advantages of folded dipole antenna.

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

    a) i) Explain structure of rectangular microstrip patch antenna with its radiation pattern.

      ii) List any two applications of rectangular microstrip patch antenna.

    b) i) Explain electromagnetic spectrum in brief.

      ii) Write the frequency band used for TV broadcasting and mobile communication.

    c) i) The equation of FM Wave is given by 10sin (6×10^8t+5sin1250t).

      Calculate

      a) Carrier frequency

      b) Modulating frequency

      c) Modulation index

      d) Power dissipated in 10Ω resistor.

     (ii) Sketch the FM wave in time and frequency domain.

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Program Code : EJ/ET/EN/EX/EQ

Semester : Third

Course Title : Principles of Electronics Communication

Marks : 20

22334

Time: 1 Hour.

**Instructions:**

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Q.1 Attempt any FOUR.   **08 Marks**

    a) Define the term signal to noise ratio.

    b) Compare simplex and duplex mode of communication.

    c) Draw the block diagram of AM Transmitter.

    d) Identify the following blocks A, B, C, and D of communication system.
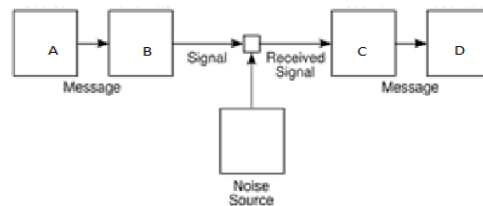
    e) Write Carson's rule to calculate bandwidth of FM wave.

    f) Write the frequency range for the following

       (i) Voice frequency (ii) IR frequency.

Q.2 Attempt any THREE.   **12 Marks**

    a) Explain electromagnetic spectrum in brief.

b) Compare amplitude modulation and frequency modulation with reference to following points:

(i) Definition (ii) Modulationindex (iii) Bandwidth (iv) Application

c) Draw the block diagram of AM super heterodyne radio receiver and state the function of each block.

d) An audio frequency signal $10\sin(2\pi \times 10^3 t)$ is used to modulate amplitude of a carrier of $20\sin(2\pi \times 10^4 t)$Calculate

(i) Modulation index (ii) Side band frequencies

(iii) percentage modulation (iv)Total power delivered to the load of 600Ω

e) In FM, if, maximum deviation is 75 KHZ and the maximum modulating frequency is 10 KHZ, calculate the deviation ratio and bandwidth of FM.

f) Draw the practical AM diode detector circuit. Sketch its input and output waveforms.

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Q.1 Attempt any FOUR. **08 Marks**

a) Draw the block diagram of FM super heterodyne radio receiver.

b) List different types of wave propagation modes.

c) Define following terms related to antennas
 (i) Antenna resistance (ii) Directivity

d) Write the IF value of (i) MW band AM and (ii) FM radio receiver?

e) Define fading with respect to wave propagation.

f) Draw theradiation pattern of Yagi-Uda antenna.

Q.2 Attempt any THREE. **12 Marks**

a) The superheterodyne receiver withintermediate frequency of 10.7 MHz is tuned to a station operating at 93 MHz. Calculate the local oscillator frequency and image frequency.

b) Explain the working of half dipole antennawith its radiation pattern

c) Write any one application of the following antenna:-
 (i) Rectangular antenna (ii) Dish antenna
 (iii) Yagi-Uda antenna (iv) Horn antenna

d) Explain the need for AGC in the radio receiver? Explain simple AGC.

e) Explain the concept of De-emphasis with neat diagram.

f) Compare sky wave and spacewave propagation w.r.t. to following points
 (i) Frequency range (ii) Effect of fading (iii) Polarization (iv) Application