

313326

12425

3 Hours / 70 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define simplex and quadra duplex system with neat sketch.
- (b) Define the term signal to noise ratio.
- (c) State formula to calculate bandwidth of AM signal.
- (d) Draw FM wave in time domain and frequency domain.
- (e) State the need of modulation in communication system (any four).
- (f) Write the value of IF in :
 - (i) FM radio receiver
 - (ii) MW band in AM
- (g) Draw sketch of Loop Antenna along with its radiation pattern.

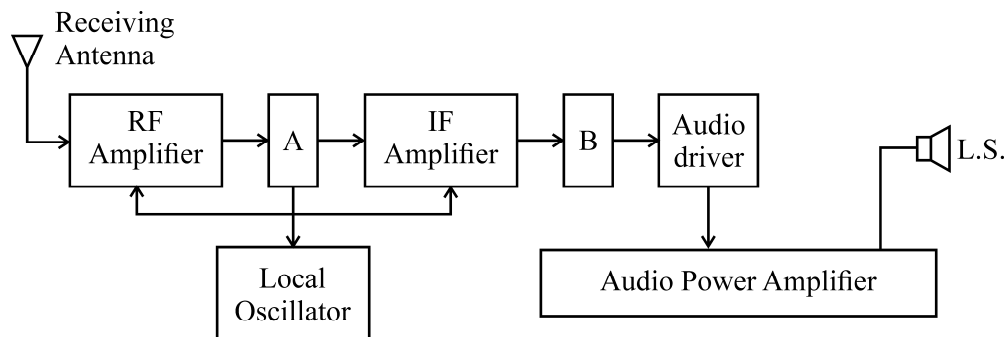


2. Attempt any THREE of the following :**12**

- (a) Compare characteristic of asynchronous and synchronous transmission mode
(any four pt.)
- (b) Justify electromagnetic wave is said to be transverse wave.
- (c) Compare AM and FM w.r.t. following points :
- Definition
 - Modulation Index
 - Bandwidth
 - Application
- (d) Draw block diagram of PLL as FM demodulator and describe function of each block.

3. Attempt any THREE of the following :**12**

- (a) Redraw the block by identifying the blank blocks. Explain the role of A and B block. (Fig. – 1)

**(Fig. – 1)**

- (b) Differentiate between ground wave and sky wave propagation (any four points).
- (c) Find out type of propagation of following applications :
- AM radio broadcasting
 - Ship to shore propagation
 - Microwave links
 - Satellite communication
- (d) Draw neat sketch of Yagi-Uda antenna and its radiation pattern. State function of each element in antenna.

4. Attempt any THREE of the following :**12**

- (a) Draw and explain block diagram of high level AM transmitter.
- (b) Differentiate between FM and PM to the following parameters :
 - (i) Definition
 - (ii) Noise
 - (iii) Constant Parameter
 - (iv) Waveforms
- (c) Explain sky wave propagation with neat sketch.
- (d) Define following terms :
 - (i) Virtual height
 - (ii) Actual height
 - (iii) Critical frequency
 - (iv) Maximum usable frequency
- (e) Compare resonant and non-resonant antenna on the basis of :
 - (i) Definition
 - (ii) Circuit
 - (iii) Reflection coefficient
 - (iv) Radiation pattern

5. Attempt any TWO of the following :**12**

- (a) Write down range of different frequencies in electromagnetic spectrum and one application area of each for following frequency :
 - (i) Voice frequency
 - (ii) High frequency
 - (iii) Infrared frequency
 - (iv) Visible spectrum
 - (v) Radio frequency
 - (vi) UV frequency

P.T.O.

- (b) Define modulation index of AM wave. Explain effect of modulation index on AM wave with waveforms.
- (c) Explain the concept of pre-emphasis and de-emphasis with circuit diagram.

6. Attempt any TWO of the following :

12

- (a) If there are three AM transmitter named A, B and C using following specifications :

- A transmitter having $P_C = 1000$ W and modulation index $m = 50\%$.
- B transmitter having $P_C = 1200$ W and modulation index $m = 60\%$
- C transmitter having $P_C = 800$ W and modulation index $m = 80\%$

Find :

- (i) Transmitted power of A, B, C.
 - (ii) Justify whether A, B & C is better as far as transmitted power.
- (b) Draw constructional details of dish antenna. Describe its operating principle. Also draw its radiation pattern.
 - (c) Write two applications of following antenna :
 - (i) Yagi-Uda antenna
 - (ii) Microwave antenna
 - (iii) Dish antenna
 - (iv) Horn antenna
 - (v) Micro strip patch antenna
 - (vi) Smart antenna
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