

313326

12526

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answer with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) 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 Analog and Digital Signal with neat sketch.
 - b) Define sensitivity of radio receiver.
 - c) Define phase modulation with waveform.
 - d) Compare Sky wave propagation and space wave propagation on the basis of following points :–
 - i) Frequency principle
 - ii) Service range.

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- e) Compare Loop antenna and ferrite rod antenna on following basis :-
- i) Working principle
 - ii) Constructions.
- f) A communication system receives a signal with a power of 10 milliwatts (mW). The noise power measured in the same system is 0.1 milliwatts (mW). Calculate the Signal-to-Noise Ratio (SNR) in decibels (dB).
- g) A 500 watt carrier is amplitude modulated to depth 60%. Calculate Total Power in AM wave.

2. Attempt any THREE of the following:

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- a) Define Noise in electronic communication also state any two types of Noise.
- b) Draw the Block Diagram of AM Superheterodyne receiver. Give range of MW band intermediate frequency.
- c) Define following term with respect to wave propagation :-
 - i) Refraction
 - ii) Reflection
 - iii) Diffraction
 - iv) Polarization.
- d) Compare resonant antenna and Non-Resonant Antenna on following points :-
 - i) Definition
 - ii) Circuit
 - iii) Reflection
 - iv) Radiation Pattern.

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

- a) Choose the correct frequency range for the following applications :-
- AM radio broadcast
 - FM broadcasting
 - Power transmission
 - Cellular Phone.
- b) In FM, if the maximum deviation is 7.5 kHz and the maximum modulating frequency is 10 kHz. Calculate the deviation ratio and BW of FM.
- c) Find out types of propagation for following :-
- AM radio broadcasting
 - Ship to shore propagation
 - Microwave Link
 - Satellite communications.
- d) Draw radiation pattern of following resonant dipoles :-
- $L = \lambda/2$
 - $L = \lambda$
 - $L = 3\lambda/2$
 - $L = 3\lambda$.

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

- a) Choose the different types of layers of atmosphere which satisfy following condition :-
- Reflect low frequency absorbs medium frequency and high frequency wave to some degree.
 - Helps surface waves and reflect high frequency waves.
 - Exists in day times only.
 - Exists in day time but merges with F_2 layer in night time.

- b) Choose proper antenna for following application :-
- Portable radio receivers
 - VHF for mobile communication
 - At VHF as TV receiving antenna.
 - In missiles - radars, fuzing and telemetry.
- c) Explain concepts of fading. State reasons of fading.
- d) Compare Wideband FM and Narrow band FM with respect to following points :-
- Modulation Index
 - Maximum deviation
 - Bandwidth
 - Application.
- e) Explain with neat sketch Block diagram of Armstrong method to generate FM Wave.

5. Attempt any TWO of the following:

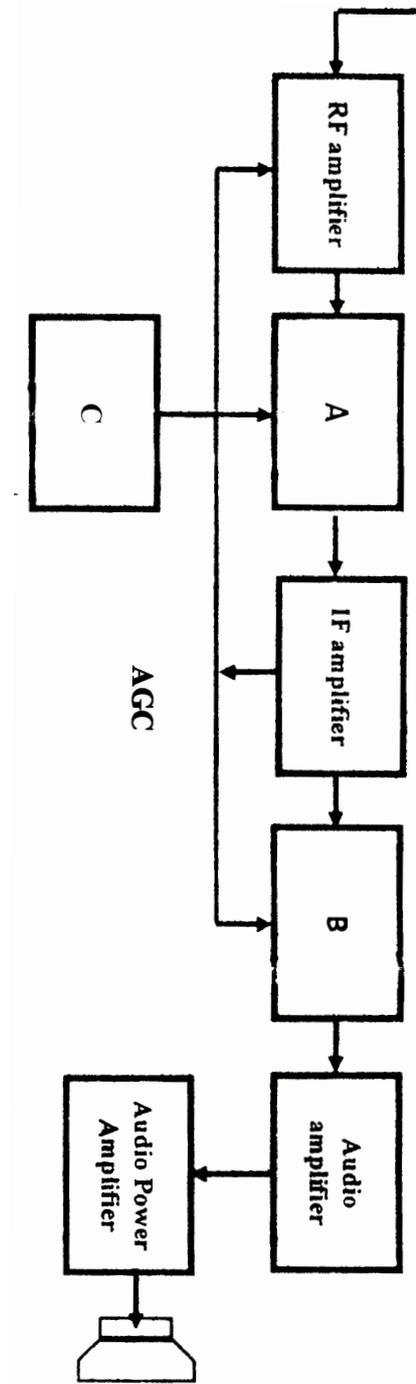
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- a) Explain the function of each block in a basic analog communication system. Illustrate your explanation by describing how a voice signal is transmitted from a microphone to a receiver, detailing the role of the transmitter, channel and receiver blocks.
- b) Compare DSB-FC(AM), DSB-SC, SSB with respect to following points :-
- Carrier suppression
 - Sideband Supression
 - Bandwidth
 - Transmission Efficiency
 - Number of Modulating inputs
 - Application.
- c) Describe microstrip antenna with neat diagram. Also draw radiation pattern of micro strip antenna.

6. Attempt any TWO of the following:

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- a) Redraw the provided block diagram, identifying the blank block. Describe the functions of blocks A, B and C as shown in Figure No. 1.

Fig. No. 1

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Marks

- b) List different types of FM detection and with the help of neat block diagram explain PLL as FM demodulator.
- c) The equation of AM wave is given by

$$e_{AM} = 40 \sin (6 \times 10^8 t + 4 \sin 1250 t).$$

Calculate :-

- i) Carrier frequency
 - ii) Modulating frequency
 - iii) Modulation index
 - iv) Power dissipated in 10Ω resistor.
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