

17316

11920

3 Hours / 100 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 answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

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|-----------|---|--------------|
| 1. | (A) Attempt any SIX : | 12 |
| | (a) Define amplitude and frequency of a sound wave. | |
| | (b) Define Bass and Treble. | |
| | (c) State the principle of optical recording. | |
| | (d) Define amplitude modulation. | |
| | (e) State the noise reduction techniques. | |
| | (f) List any four characteristics of microphone. | |
| | (g) State the types and characteristics of audio amplifier. | |
| | (h) Draw the circuit diagram of single transistor power amplifier. | |
| | (B) Attempt any TWO : | 8 |
| | (a) Explain the block diagram of communication system. | |
| | (b) What is the B.W. required for F.M. in which maximum deviation is 5kHz and modulation index is 3 ? Assume highest needed sideband are 6. | |
| | (c) State the reasons due to which noise is reduced in Dolby System as compared to other audio system. | |

- 2. Attempt any FOUR :** **16**
- (a) Draw neat diagram and explain operation of 3-way crossover network.
 - (b) Draw neat diagram of optical pickup unit used in CD players and label all components.
 - (c) State the necessity of public addressing system.
 - (d) State causes affecting fidelity and their remedies.
 - (e) Draw the block diagram of PA system and explain its working principle.
 - (f) Compare AM and FM. (Any 4 points)
- 3. Attempt any FOUR :** **16**
- (a) Derive the mathematical expression for power relation in AM.
 - (b) A modulating signal $10 \sin (2\pi \times 10^3 t)$ is used to modulate a carrier signal $20 \sin (2\pi \times 10^4 t)$. Find the modulation index, frequency of the sideband components and their amplitudes. What is the B.W. of modulated signal ?
 - (c) Draw the circuit diagram of varactor diode method to generate FM and state its principle of working.
 - (d) A 10 kW carrier wave is amplitude modulated at 80% depth of modulation by a sinusoidal modulating signal. Calculate sideband power, total power and transmission efficiency of the AM wave.
 - (e) Explain how the pre-emphasis and de-emphasis circuits are used for noise reduction.
 - (f) What is phase modulation ? Draw its waveforms and state its modulation index.
- 4. Attempt any FOUR :** **16**
- (a) Draw block diagram of Armstrong frequency modulator.
 - (b) What is DSBSC ? Draw its time domain and frequency domain representation.
 - (c) State the need and application of public address system.
 - (d) State the working principle of moving coil microphone.
 - (e) With neat circuit diagram, explain operation of complementary symmetry push pull amplifier.
 - (f) Explain the block diagram of detection circuit.

5. Attempt any FOUR :**16**

- (a) Differentiate between direct and indirect methods of frequency modulation.
(Any 4 points)
- (b) Explain the generation of SSB AM signal using phase shift method.
- (c) State difference between monophony and stereophony.
- (d) Draw multiway speaker system and describe its working.
- (e) Explain construction and working of horn type loudspeaker.
- (f) Draw the block diagram of FM transmitter and explain each block.

6. Attempt any FOUR :**16**

- (a) Explain digital interface microphone.
 - (b) Draw the block diagram of Hi-Fi system and explain it.
 - (c) Explain the planning and installation steps of a typical public address system.
 - (d) Draw the neat circuit diagram of class A voltage pre-amplifier.
 - (e) Define the following terms for FM :
 - (i) Frequency Deviation
 - (ii) Modulation Index
 - (iii) Deviation Ratio
 - (f) State the concept of vestigial sideband.
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