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3 Hours / 100 Marks Seat No. | | | | | | | | |

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. A) Attempt **any six** of the following : **(6×2=12)**

i) Write down formula showing relationship between frequency and wavelength. If the frequency of signal is 18 KHz, calculate the wavelength.

ii) What is the function of Bass and Treble control in HIFI audio amplifier ?

iii) Define phase modulation and its modulation index.

iv) Enlist specification of compact disc (4 points).

v) State principle of magnetic recording.

vi) Define timbre, pitch.

vii) State the need of graphic equilizer.

viii) Draw the block diagram of HI-FI system.

B) Attempt **any two** of the following : **(4×2=8)**

i) A 500 watt carrier is modulated to a depth of 80%. Calculate the total power in modulated wave. What will be the change in total power of the modulated wave if we reduce modulation percentage from 80% to 70% by keeping same power of a carrier ?

ii) Find the carrier frequency, modulating frequency, modulation index and maximum deviation of the FM wave represented by the voltage equation $\upsilon = 12 \sin (6 \times 10^8 t + 5 \sin 1250t)$.

iii) What is significance of low pass filter, band pass filter and high pass filter in Dolby-A system (with frequency ranges) ?

2. Attempt **any four** of the following : **(4×4=16)**

i) Compare Woofer and Tweeter on the basis of (a) definition (b) size (c) weight (d) frequency range.

ii) Enlist advantages of Compact Disc (4 points).

iii) Draw the block diagram of PA system. Explain function of each block.

P.T.O.

Marks

iv) Explain the variable density method of optical recording of sound on film.

v) With neat block diagram explain the generation of SSB by "Third Method".

vi) Draw the varacter diode modulator used for generation of F.M. Explain its working.

3. Attempt **any four** of the following : **(4×4=16)**

i) Draw the waveform of amplitude modulated envelope for modulation index m = 1. What change will take place in amplitude modulated waveform if increase modulation index from 1 to 1.5 ? Explain with neat sketch.

ii) Draw the block diagram of communication system. Explain operation of each block.

iii) Draw the block diagram of Armstrong frequency modulator system. What is the function of balanced modulator in Armstrong frequency modulator system ?

iv) Define modulation. Enlist different types of modulation. Explain need of modulation.

v) Explain the terms : preemphasis and deemphasis.

vi) Define frequency modulation. Draw the waveform of frequency modulation. How many number of sidebands present in frequency modulated wave ?

4. Attempt **any four** of the following : **(4×4=16)**

i) Draw the block diagram of FM transmitter. Enlist advantages of FM over AM.

ii) Define amplitude modulation. Explain the term bandwidth of AM wave.

iii) Enlist four specifications of PA system.

iv) Explain concept and necessity of reverberation.

v) Explain class-A voltage pre-amplifier.

vi) Draw and explain optical recording on compact disc.

5. Attempt **any four** of the following : **(4×4=16)**

i) Draw and explain reactance modulator for generation of FM.

ii) With neat block diagram explain AM transmitter.

iii) Explain ribbon microphone with construction and working principle.

iv) Compare monophony and stereophony (any 4 points).

v) Explain, how noise cancelling is done in radio noise cancelling microphones ?

vi) Explain the concept of vestigial side band transmission.

6. Attempt **any four** of the following : **(4×4=16)**

i) Draw the circuit diagram of 3 way speaker system. Explain its operation.

ii) Draw the circuit diagram of different stereo controls. Explain balance control and blend control.

iii) Explain typical PA installation plan for public meeting.

iv) What is fidelity ? Explain causes affecting fidelity.

v) Draw and explain complementary symmetry push pull amplifier.

vi) Convert the carrier frequency 25 MHz and modulating frequency 400 Hz in rad/s. What is modulation index of FM if δ = 10 KHz and fm = 400 Hz ?
