

17440

21415

3 Hours / 100 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.

Marks

1. (A) Attempt any SIX from the following :

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- (a) Write down different frequencies for following (frequency ranges) :
- (1) Voice frequency
 - (2) High frequency
 - (3) IR frequency
 - (4) Visible Spectrum (light)
- (b) Define modulation index for FM.
- (c) Define pulse modulation. State its types.
- (d) What are the different types of FM detector ?
- (e) What is the purpose of keeping RF section before mixer stage ?
- (f) Define stub. State its two advantages.
- (g) What are the different types of wave propagation ?
- (h) Define antenna resistance and antenna gain.

(B) Attempt any TWO from the following :

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- (a) Draw Yagi-uda antenna with its radiation pattern.
- (b) Compare ground wave and sky wave propagation for four points.
- (c) Draw block diagram of basic electronic communication system. Describe its working principle.

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- 2. Attempt any FOUR from the following :** **16**
- (a) Explain with circuit diagram PWM using IC 555.
 - (b) Explain half dipole antenna (Resonant antenna) with its radiation pattern.
 - (c) Differentiate between simplex and duplex mode of communication.
 - (d) Draw block diagram of AM superheterodyne receiver and explain its working principle.
 - (e) Write a mathematical expression for amplitude modulated wave.
 - (f) Draw and explain equivalent circuit of a transmission line.
- 3. Attempt any FOUR from the following :** **16**
- (a) Explain the working of varactor diode reactance modulator for FM generation.
 - (b) A practical antenna has directive gain of 5 dB radiate 1200 watt power. How much power an isotropic antenna should radiate in order to have the same power density at the same distance ?
 - (c) Explain standing waves with load terminal open circuited and short circuited.
 - (d) Explain Duct Propagation.
 - (e) Define Image Frequency. The RF local oscillator frequency, IF frequencies for AM. Receiver are 800 kHz, 1255 kHz and 455 kHz respectively. Determine image frequency.
 - (f) Explain power relations in AM wave.
- 4. Attempt any FOUR from the following :** **16**
- (a) Draw and explain circuit of AM modulators using BJT.
 - (b) Compare the bandwidth that would be required to transmit baseband signal with a frequency range from 300 Hz to 3 kHz using
 - (1) Narrow band FM with maximum deviation of 5 kHz
 - (2) Wideband FM with maximum deviation of 75 kHz.
 - (c) Explain working of Balun with diagram.
 - (d) Explain :
 - (1) Critical Frequency
 - (2) Skip distance
 - (e) What are different microwave antenna ? Explain horn antenna.
 - (f) Explain single and double stub matching.

5. Attempt any FOUR from the following :**16**

- (a) Explain the working of De-emphasis ckt.
- (b) Draw block diagram of FM receiver.
- (c) Explain quarter wavelength transformer.
- (d) The operating frequency for pyramidal horn antenna is 10 GHz. The horn antenna is 10 cm high and 12 cm wide. Calculate :
 - (1) Beam width of antenna
 - (2) Power gain of antenna, if $K = 5$.
- (e) Explain the working of FM demodulator using phase lock loop with the help of circuit diagram.
- (f) State the different losses in transmission line.

6. Attempt any FOUR from the following :**16**

- (a) Draw block diagram of PPM. Draw waveforms to explain the working of PPM.
 - (b) Explain sensitivity and selectivity for AM radio receiver.
 - (c) Explain the working of phase discriminator FM.
 - (d) Explain demodulation of AM signal using practical diode detector.
 - (e) What is frequency changing and tracking ?
 - (f) For 2 meter diameter parabolic reflector with 10 watt of power radiated by the feed mechanism operating at 6 GHz with transmit antenna efficiency of 55%. Determine :
 - (1) Beam width of antenna
 - (2) Transmit power gain
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