24225			
3 Hours	/	70	Marks

Seat No.

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.

Marks

1. Attempt any FIVE of the following:

10

- (a) List types of internal and external noise.
- (b) Draw FM signal in time domain.
- (c) State the formula for total power required for AM wave.
- (d) Define AGC in radio receiver.
- (e) List different methods of generation of FM.
- (f) State the concept of fading in sky wave propagation.
- (g) Draw sketch of folded dipole antenna and its radiation pattern.

2. Attempt any THREE of the following:

12

- (a) State the frequency range of the following:
 - (1) High frequency
- (2) VHF

(3) UHF

- (4) Infrared
- (b) Draw block diagram of AM receiver and state the function of each block.
- (c) Draw label sketch of AM wave in time domain and frequency domain.
- (d) Draw and explain circuit diagram of practical diode detector of AM wave.



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(3)

Maximum deviation

3. Attempt any THREE of the following: 12 A 20 kW carrier wave is modulated at 70% depth of modulation by (a) modulating signal. Calculate: (1) total power. side band power of AM wave. (2) Describe the concept of actual height and virtual height in sky wave (b) propagation. Describe with neat sketch half duplex and full duplex transmission mode. (c) (d) Explain FM circuit using varactor diode. Attempt any THREE of the following: 12 4. Describe troposphere scatter propagation. (b) Compare AM and FM (any four points). Draw block diagram of FM receiver and state the function of each block. (c) (d) Describe vagi-uda antenna with neat sketch. (e) Describe the structure and radiation pattern of rectangular micro-strip patch antenna. Attempt any TWO of the following: 5. 12 Describe ionospheric propagation with neat sketch. (a) (b) Describe SSB and VSB of amplitude modulation. Draw the radiation pattern of following resonant dipole antenna: (c) $l = \lambda/2$ (1) (2) $l = \lambda$ (3) $l 3\lambda/2$ (4) $l = 3\lambda$ where l is length of dipole antenna. 6. Attempt any TWO of the following: 12 Describe operating principle of dish antenna. Draw its constructional details (a) and radiation pattern. Describe different types of internal and external noise. (b) A frequency modulated signal is represented by the voltage equation (c) $e_{fm} = 15 \sin (6 \times 10^8.t + 5 \sin 1300.t)$. Calculate: Carrier frequency fc **(1)** (2) Modulating frequency