

B.Sc. Prog. / III

AS

EL-301 : ELECTRONICS COMMUNICATIONS

(Admissions of 2005 and onwards)

Time : 3 hours

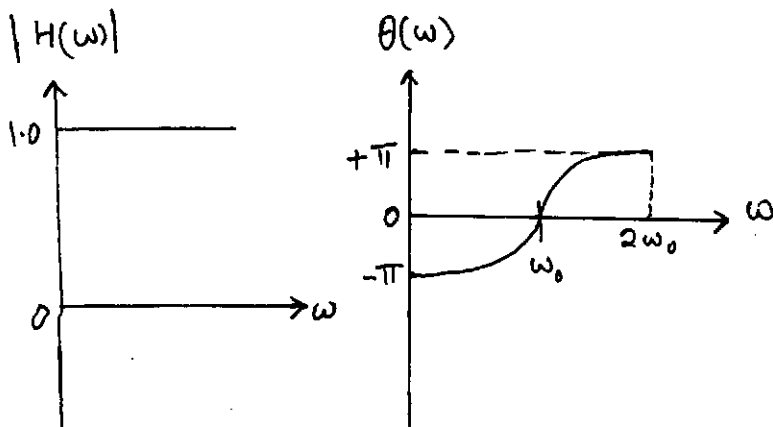
Maximum Marks : 75

(Write your Roll No. on the top immediately
on receipt of this question paper.)

Attempt any five questions.
All questions carry equal marks.

1. (a) Define frequency modulation and explain it using relevant diagrams. Explain frequency deviation. Obtain an expression for the frequency modulated wave. 8

(b) Transfer function of a network is given below:



If the input signal applied to the network is $v(t) = \sin \omega_0 t + \frac{1}{2} \sin 2\omega_0 t$, write the expression for output voltage $v_0(t)$ and plot it. 7

2. (a) Obtain the equations for the total power and current in the amplitude modulated wave. Find the power in a single sideband. 7

(b) An audio signal $15 \sin 2\pi(1500t)$ amplitude modulates a carrier $60 \sin 2\pi(100000t)$.

(i) Sketch the audio, carrier and modulated signals.

(ii) Find percentage modulation.

(iii) Draw frequency spectrum. 8

3. (a) Explain with the help of a circuit diagram and necessary theory the working of a balanced modulator. 8

(b) Draw the circuit of a diode envelope detector and explain its working with relevant waveforms. 7

4. (a) Draw the block diagram of a TRF receiver and explain the function of each block. What are the drawbacks of TRF? 8

- (b) State and prove Sampling theorem. 7
5. (a) Draw the block diagram of a PCM receiver and explain the function of each block. 8
- (b) Give the block diagram for TDM and explain its functioning. 7
6. (a) What is PPM? Draw the block diagram of a PPM transmitter and show the shape of the pulse at each point. 8
- (b) Explain what is ASK. Explain with block diagram the functioning of ASK generator. 7
7. Draw and explain the block diagram of an optical fibre communication link. What are conditions for total internal reflection? Derive an expression for acceptance angle and numerical aperture for an optical fibre. 15
8. Write short notes on any *two* of the following:
- (i) Cellular concept in mobile communication
 - (ii) CDMA
 - (iii) QPSK
 - (iv) Earth station in satellite communication.

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