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5135

Your Roll No.

B.Sc. (Prog.) / III B

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 amplitude modulation and modulation index. Find the equation for the amplitude modulated wave and draw its frequency spectrum. Obtain its bandwidth. 8
- (b) Fourier series expansion of a square wave of 1V amplitude is

$$v(t) = \frac{4}{\pi} \left[\sin \omega t + \frac{1}{3} \sin 3 \omega t + \frac{1}{5} \sin 5 \omega t + \dots \right]$$

Sketch the square wave relative to voltage/time axis. Also draw the frequency spectrum upto 7th harmonics. What is the value of dc component? 7

[P.T.O.]

2. (a) Draw the schematic diagram for collector modulator and explain its operation. 8
- (b) Determine the power contained in carrier and each of the sidebands for an amplitude modulated signal having percentage modulation of 80 per cent and total power of 2500W. 7
3. (a) Explain with the help of a circuit diagram and necessary theory the working of a balanced modulator for generation of SSBSC signals. 8
- (b) Draw the circuit diagram of a varactor diode modulator and explain its working giving necessary theory. 7
4. (a) Draw the block diagram of a super-heterodyne receiver and explain the function of each block. 8
- (b) State and prove sampling theorem. 7
5. (a) Draw the block diagram of a PCM generator and explain the function of each block. 8
- (b) Give the block diagram for FDM and explain its functioning. 7

6. (a) What is PWM? Draw the block diagram of a PWM transmitter and show the shape of the pulse at each point. 8
- (b) Explain what is PSK. Explain with block diagram the functioning of PSK generator. 7
7. What do you understand by satellite communication? Calculate the height of a geostationary satellite from the earth's ground level. Draw the satellite system block diagram for uplink and explain its various stages. 15
8. Write short notes on any two of the following: $7\frac{1}{2}, 7\frac{1}{2}$
- (a) Cellular concept in mobile communication
 - (b) GSM
 - (c) Fax and modem
 - (d) Fibre optics sources.