



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 2058**

Roll No.

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

**B.Tech**

(SEM V) ODD SEMESTER THEORY EXAMINATION 2009-10  
COMMUNICATION ENGG.

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1. Attempt any four parts of the following : 5×4=20

(a) A voltage

$$V = 200 (1 + 0.4 \sin 2\pi f_m t) \sin 2\pi f_c t$$

is applied to a resistor of 100 ohms. Find the power dissipated by each of the frequency components presents in the voltage V.

- (b) Explain frequency division multiplexing (FDM).  
(c) A carrier wave of a frequency of 20 kHz is amplitude modulated signal

$f(t) = \cos 2\pi 10^3 t + \cos 4\pi 10^3 t$ . Find the expression for the corresponding SSB-SC signal.

- (d) Explain how the constant intermediate frequency is achieved in the superheterodyne receiver.  
(e) What is simple automatic gain control ? What are its function ?  
(f) Explain and draw block diagram of an SSB transmitter using the filter system.



2 Attempt any **four** parts of the following : **5×4=20**

- (a) Determine and draw the instantaneous frequency of a wave having a total phase angle given by

$$\psi(t) = 2000t + \sin 10t$$

- (b) What is the function of the balanced modulator in the Armstrong modulation system ?
- (c) Show that the output signal to noise ratio in an FM system is related to the AM system as follows :

$$\frac{[S_o/N_o]_{FM}}{[S_o/N_o]_{AM}} = 3 \left( \frac{AK_f}{w_m} \right)^2$$

- (d) Show that a low pass filter can be used as a discriminator.
- (e) Explain spike generation and threshold effect in FM.
- (f) Explain the effect of random noise on the output of an FM receiver fitted with an amplitude limiter.

3 Attempt any **two** parts of the following : **10×2=20**

- (a) What is quantization error ? How does it depend upon the step size ? Suggest some methods to overcome the difficulties encountered when the modulating signal amplitude swing is large.
- (b) Describe delta modulation systems. What are its limitations ? How can they be overcome ?
- (c) Explain adaptive Delta modulation. And compare between PCM and DM.

4 Attempt any **two** parts of the following : **10×2=20**

- (a) Describe in detail the main abnormal ionospheric variations, including a brief mention of the interference that may be caused by the sporadic E layer.
- (b) Briefly explain :
- (i) Stationary satellite system
  - (ii) Transponders.
- (c) Explain in brief :
- (i) Cellular system
  - (ii) Personal communication system.

5 Attempt any **two** parts of the following : **10×2=20**

- (a) Using circuit diagram, explain how sync pulses are obtained from the composite video waveform, and how, in turn horizontal sync pulses are extracted.
- (b) briefly discuss :
- (i) Evanescent field
  - (ii) Cross Hanchen shift
  - (iii) Mode coupling.
- (c) Define normalised frequency for an optical fiber and explain its uses in determination of number of guided modes propagating within a step index fiber.