Unit - V

a) What is geosynchronous satellite system?

b) Discuss the antenna requirements for large and small earth stations.

c) Discuss the classification of an earth station on the basis of the variety of equipments required.

d) Describe satellite space craft system. How attitude control is maintained in space system antenna.

OR

A satellite downlink at 12 GHz operates with a transmit power of 6W and an antenna gain of 48.2 db calculate the EIRP in dBW.

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EX - 601

B.E. VI Semester

Examination, December 2015

Communication Engineering

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What do you understand by deterministic and random signal?

b) Discriminate between energy signals and power signals.

c) Obtain frequency domain representation of $e^{-at}u(t)$. Draw its waveforms.

d) Find Fourier transform of periodic gate function. The Fourier series for this function is given by

$$f(t) = \frac{A\delta}{T} \sum_{n=-a}^{\infty} S.a\left(\frac{n\pi\delta}{T}\right)e^{jn\omega t}$$

δ is width of gate function

Sa(x) is the sampling function

Other symbol has usual meaning

OR

Evaluate the inverse Fourier transform of $Sa^2(Wt)$ by using time convolution theorem. Evaluate the convolution integral graphically.

Unit - II

a) What is DSB-SC system? Mention its advantages.

b) What do you understand by vestigial sideband transmission? Where it is being used?

c) Draw the phasor diagram of FM signal. Discuss any method of FM generation.

d) A distorted form of a sinusoidal wave $\cos^3 \omega_c t$ is available. To obtain DSB-SC signal a modulating signal $f(t)$ is multiplied by this distorted carrier waveform. Find and sketch the spectrum of the product $f(t) \cos^3 \omega_c t$. How can the desired modulating signal $f(t) \cos \omega_c t$ be obtained from this product?

OR

Explain qualitatively what will happen if an envelope detector is used to demodulate a DSB-SC signal.

Unit - III

a) Draw the block diagram of superheterodyne receiver. How is it different from straight receiver.

b) What is the purpose of RF amplifier in radio receiver?

c) Draw the circuit of FM discriminator and explain its working.

d) A 100 MHz carrier is frequency modulated by a sinusoidal signal of 10kHz so that the maximum frequency deviation is 1MHz. Determine the approximate bandwidth of the FM carrier.

OR

A carrier of 10MHz is phase modulated by a sinusoidal signal of 10kHz and unit amplitude and the maximum phase deviation is two radians. Calculate the bandwidth of the PM carrier.

Unit - IV

4. a) What is instantaneous sampling?

b) Mention advantages of flat top sampling.

c) A signal $f(t)$ is band limited to fm Hz. It is sampled using triangular pulse of time T less than its time period T and amplitude is unity. Sketch spectrum of sampled version.

d) For following band limited signal find minimum sampling rate.

i) $e^{-2t}.\cos100t\, u(t)$

ii) $t.e^{-t}u(t)$

OR

Describe PSK, FSK and QPSK with required waveforms.