



ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE - 2008
ANALOG COMMUNICATION
SEMESTER - 4

Time : 3 Hours]

[Full Marks : 70

GROUP - A**(Multiple Choice Type Questions)**1. Choose the correct alternatives for any ten of the following : 10 × 1 = 10i) If $X(\omega)$ is the Fourier transform of $x(t)$, then the Fourier transform of $x(t)e^{j\omega_0 t}$

a) $X(\omega - \omega_0)$

b) $X(\omega_0 - \omega)$

c) $X(\omega + \omega_0)$

d) $X(\omega_0)$

ii) For envelop detection in AM the value of RC should be

a) $1/W \ll RC \ll 1/f_c$

b) $1/W \gg RC \gg 1/f_c$

c) $1/W \ll 1/RC \ll 1/f_c$

d) $W \ll RC \ll f_c$

iii) The capacity C of AWGN channel is given by

a) $B \log_{10}(1+S/N) b/s$

b) $B \log_2(1+S/N) b/s$

c) $B \log_{10}(1+N/S) b/s$

d) $B \log_2(1+N/S) b/s$

iv) According to Carson's rule the bandwidth of FM signal is expressed as

a) $B = 2\Delta f + f_m$

b) $B = \Delta f + f_m$

c) $B = \Delta f + 2f_m$

d) $B = \Delta f + f_m/2$

v) Varactor diode is used for

a) FM generation

b) AM generation

c) PM generation

d) All of these.

**GROUP - C****(Long Answer Type Questions)**Answer any *three* of the following questions.

3 × 15 = 45

7. a) Explain with suitable block diagram the generation of FM signal using Armstrong method. 5
- b) What is Narrowband FM and Wideband FM ? 2
- c) Explain with proper expression
- i) modulation index for FM
- ii) bandwidth required for transmission of FM. 4
- d) The maximum deviation allowed in an FM broadcast system is 75 kHz. If the modulating signal is a single tone sinusoid of 10 kHz, find the bandwidth of the FM signal. What will be the change in the bandwidth, if the modulating frequency is doubled ? Determine the bandwidth when modulating signal amplitude is also doubled. 4
8. a) Define DSB-SC and SSB-SC. 4
- b) With neat block diagram explain the principle of SSB-SC generation by phase shift method. What is VSB-SC modulation ? 4 + 3
- c) Briefly explain QAM. 4
9. a) What do you mean by 'switching modulator' ? How can ring modulation be acted as switching modulator ? 5
- b) Show that an AM system using synchronous detection does not suffer from threshold effect. 5
- c) Compare FDM with a quadrature carrier multiplexing. 5



10. a) Discuss the methods for modulation and demodulation of PAM signal. 6
- b) Compare PAM with PWM system of signal/data transmission. 6
- c) Explain the terms 'sensitivity', 'selectivity' and 'fidelity' of a receiver. 3
11. a) In a multipath transmission system, the input and output are related by :
 $y(t) = x(t) + ax(t - \tau)$, where a and τ are constants. Determine the transfer function of the equalizer to compensate the channel induced distortion. 6
- b) Determine the performance of an FM system in the presence of additive Gaussian noise. Discuss briefly the improvement offered in noise performance by pre-emphasis and de-emphasis concepts. 9
12. Write short notes on any three of the following : 3 x 5
- Superheterodyne receiver
 - Entropy
 - Stereophonic FM broadcasting
 - Source coding
 - Convolution theorem.

END