

b) Derive the expression for PM and FM waves. Hence Comment of the relation-ship between them.

c) A 500W carrier is modulated on the depth of 50%.

Calculate the total power and efficiency for the modulated wave in the following form of AM: i) DSB-FC ii) DSB-SC 5+(3+3)+4

8. a) What is the difference between AM and FM / PM?
- b) With a neat sketch describe the indirect method of FM generation (Armstrong Method).
- c) What is SNR and Noise figure?
- d) Explain the working principle of envelop detector. 3+5+2+5
9. a) State and prove sampling theorem.
- b) What is Nyquist Rate, Nyquist interval and aliasing effect. To avoid aliasing, find nyquist rate if signal $X(t) = 8 \cos(2000\pi t)$.
- c) Compare between ASK, FSK and PSK.
10. a) With suitable example, explain the various transmission modes.
- b) Explain any one guided and one unguided medium with their advantages & disadvantages.
- c) Explain with diagram, the request-reply mechanism of DTE and DCE.
- d) What do you understand by the terms port and socket? 3+5+5+2
11. a) What is multiplexing? Explain the TDM technique with diagram. What is bit padding?
- b) Compare among circuit, message and packet switching techniques.
- c) Explain the frame format of HDLC. What are NRM and ABM?
- d) Explain in brief, the classification of IP address? 5+3+4+3

5+3+4+3

2014

Communication Engineering

Time Alloted : 3 Hours

Full Marks : 70

The figure in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable

GROUP - A

(Multiple Choice Questions)

Choose the correct alternative of the following:

10x1=10

- i) Demodulation of DSB-SC signal requires
 - a) An envelope detector
 - b) an integrator
 - c) a synchronous detector
 - d) a discriminator
- ii) An angled modulated signal is expressed by $F(t) = \cos(2 \times 10^4 \pi t + 75 \sin 2 \times 10^3 \pi t)$
The peak frequency deviation of the carrier will be

a) 1KHz	b) 7.5 KHz
c) 75 KHz	d) 100 MHz
- iii) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is

a) unchanged	b) halved
c) doubled	d) increased by 50%.

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[Turn over]

- iv) The maximum bandwidth of commercial FM transmission is
 a) 250 KHz b) 100 KHz
 c) 150 KHz d) 200 KHz
- v) In communication system noise is most likely to affect the signal
 a) at transmitter b) in channel
 c) in information source d) at destination
- vi) Communication is the process of
 a) keeping in touch
 b) broadcasting
 c) exchanging information
 d) entertainment by electronics
- vii) The primary communication resources are
 a) Transmitter and receiver
 b) Source and antennae
 c) Transmitted power and Channel bandwidth
 d) Channel and noise
- viii) The Nyquist rate of sampling for the signal $X(t) = \text{sinc}(200t) + \text{sinc}^2(200t)$ is
 a) 200 b) 300
 c) 400 d) 250
- ix) In QAM both identities _____ are varied.
 a) Amplitude and phase b) frequency and phase
 c) bit rate and phase d) baud
- x) Efficiency of coding will be maximum when average code length (L) and entropy [H(m)] is
 a) $L = H(m)$ b) $L > H(m)$
 c) $L < H(m)$ d) None of the above

Group-B

(Short answer type questions)
 Answer any *three* of the following

5x3=15

- 1 Draw the block diagram of a communication system and explain the function of each block in short.
- 2 Prove that for a single tone AM with 100% modulation, only $\frac{1}{3}$ rd of total transmitted power is carried by modulating signal.
- 3 With a neat sketch describe the indirect method of FM generation (Armstrong Method).
- 4 Two channels, one with a bit rate of 100 Kbps and another with a bit rate of 200Kbps are to be multiplexed using TDM. How this can be achieved? What are the duration and rate of frame and bit for this scenario? (1+2+2)
- 5 a) Let a signal travels through a transmission medium and its power is reduced to one half. What is the attenuation?
 b) Find the maximum bit rate of a FSK signal if the bandwidth of the medium is 12 KHz and the difference between two carriers is 2KHz. The transmission is in full duplex mode. (2+3)

Group – C

(Long answer type questions)
 Answer any *three* of the following

3x15=45

- 1 a) Considering a sinusoidal modulation signal $m(t)$ and $c(t)$, draw the following wave forms:
 i) AM signal
 ii) FM signal
 iii) PM signal.