



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/B.TECH(BME)/SEM-5/BME-505/2011-12**

**2011**

**COMMUNICATION CIRCUITS & SYSTEMS**

Time Allotted : 3 Hours

Full Marks : 70

*The figures 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 Type Questions )**

1. Choose the correct alternatives for the following :  $10 \times 1 = 10$ 
  - i) For critical modulation, the value of modulation index is
    - a)  $< 1$
    - b)  $= 1$
    - c)  $> 1$
    - d)  $\sim 1$ .
  - ii) Baseband transmission is the transmission of ..... signal.
    - a) Modulated
    - b) Carrier
    - c) Broadband
    - d) Information.
  - iii) The angle modulation is
    - a) only AM
    - b) both PM & FM
    - c) both AM & FM
    - d) only FM.



- iv) The distortion of the signal occur when
- a)  $V_m = V_c$                       b)  $V_m < V_c$   
c)  $V_m > V_c$                       d)  $V_c = 0$ .
- v) The single sideband power is
- a)  $(P_c M^2)/4$                       b)  $(P_c M^2) * 4$   
c)  $(P_c M^3)/4$                       d)  $(P_c M^4)/4$ .
- vi) In NBFM phasor diagram the Resultant has ..... amplitude with carrier but / and ..... phase.
- a) same, in                      b) different, out of  
c) different, in                      d) same, out of.
- vii) PLL is the application of
- a) Amplitude Demodulator  
b) Frequency Demodulator  
c) Amplitude Modulator  
d) Frequency Modulator.
- viii) Class AB amplifier conducts for
- a)  $90^\circ$   
b) greater than  $180^\circ$   
c) less than  $360^\circ$   
d) less than  $360^\circ$  but more than  $180^\circ$ .
- ix) The length of antenna to transmit a signal must be at least
- a)  $\frac{1}{3}$ rd wavelength                      b)  $\frac{2}{3}$ rd wavelength  
c)  $\frac{1}{4}$ th wavelength                      d) none of these.





**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.

$3 \times 15 = 45$

8. With a neat sketch explain the operating principle of Class B power amplifier. What are the advantages and disadvantages of tuned circuit over untuned ? Draw the circuit of a double tuned power amplifier. 6 + 5 + 4
9. Draw a block diagram of general communication system. Why is modulation necessary ? Explain the operating principle of any amplitude demodulator. What are the advantages and disadvantages of FM over AM ? Find out the percentage of modulation index if an antenna current changes from 4.8 A un-modulated carrier to 5.1 A. 3 + 3 + 5 + 2 + 2
10. Explain the frequency division multiplexing and de-multiplexing with a neat sketch. What do you mean by lock range and capture range of phased lock loop ? Find out the Image Frequency and its Rejection Ratio at 1000 kHz and 25 MHz for a broadcasting Super-heterodyne Receiver with no RF amplifier with the input of loaded  $Q$  of the antenna coupling circuit is 100 and the intermediate frequency is 455 kHz. 8 + 3 + 4
11. Write down the definition of Sampling theorem and prove it mathematically. Explain the modulation and demodulation of any of its application. What is the significance of Code Division Multiplication ? 7 + 6 + 2
12. How will you convert analog signal to its digital form by Successive approximation ? Explain the Delta modulation with a neat sketch. What are the limitations of it and how will you overcome it ? 7 + 4 + 4
13. What are the different components of biotelemetry ? What are the typical applications of telemetry in biomedicine ? Describe a single channel biotelemetry system with a neat sketch. 6 + 4 + 5

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