

Q.P. Code – 42344

Third Semester B.Sc. Degree Examination, October/November 2019

(CBCS Scheme)

Electronics

**Paper III – COMMUNICATION ELECTRONICS**

Time : 3 Hours]

[Max. Marks : 90

Instructions to Candidates : Answer any **TEN** questions from Part – A any **FIVE** questions from Part – B, any **FIVE** questions from Part – C and any **FIVE** questions from Part – D.

PART – A

Answer any **TEN** questions.

(10 × 1 = 10)

1. Define SNR.
2. What is radio spectrum?
3. Define modulation index of AM wave.
4. Define frequency deviation in FM.
5. Define sensitivity of a receiver.
6. What is PAM?
7. Name the digital modulation scheme which is also called as ON-OFF keying.
8. What is cross talk?
9. Write the expression for FSK waveform.
10. Name any one factor which decides the life span of a satellite.
11. What is Half duplex in communication system?
12. What is Frequency reuse?

PART – B

Answer any **FIVE** questions.

(5 × 8 = 40)

13. (a) Draw the block diagram of communication system and explain each block.  
(b) Differentiate between analog and digital communication. (4 + 4)

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14. (a) With relevant diagram, derive the expression for modulation index in terms of  $V_{\max}$  and  $V_{\min}$  in AM wave.  
(b) Draw the block diagram of SSB generation system using phase shift method and explain. (4 + 4)
15. (a) Draw the circuit diagram of diode detector. With relevant waveforms at each component, explain its working.  
(b) Write a note on pre-emphasis and de-emphasis. (4 + 4)
16. (a) Draw the block diagram of SHD FM receiver and explain each block.  
(b) Explain PWM with relevant waveforms. Mention its advantage over PPM. (4 + 4)
17. (a) Draw the block diagram of digital communication system and explain briefly.  
(b) Explain pulse code modulation. (4 + 4)
18. (a) What is BPSK? Explain BPSK with relevant waveforms.  
(b) Mention various satellite orbits. Explain any one. (4 + 4)
19. (a) Write a note on GPS.  
(b) Explain TDMA and FDMA. Mention their advantages and disadvantages. (4 + 4)
20. (a) Draw and explain block diagram of mobile communication system.  
(b) Draw the simplified block diagram of a cell phone hand set and explain. (4 + 4)

### PART – C

Answer any **FIVE** questions.

(5 × 6 = 30)

21. An amplifier operating over a frequency range from 100 MHz to 120 MHz has a  $10\text{ k}\Omega$  input resistor. What is the rms noise voltage at the input of this amplifier if ambient temperature is  $17^\circ\text{C}$ ? What is the new value of noise voltage, when ambient temperature is increased to  $27^\circ\text{C}$ ?
22. An AM wave has a carrier component of 10 V peak and side band components of 4 V peak. If this is dissipated through a resistor of  $1\text{ k}\Omega$ , Calculate :
- (a) Carrier power
  - (b) Upper and lower side band powers
  - (c) Total power

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23. When a SHD receiver is tuned to 800 kHz, its local oscillator provides mixer with an input at 1255 kHz. What is the image frequency? If the antenna of this receiver is connected to the mixer via a tuned circuit whose loaded Q is 75, what will be the rejection ratio for the calculated image frequency?
24. A transmission channel with a data transfer speed of 64 Kbps has a bandwidth of 12 kHz. Calculate signal to noise ratio for binary code. Also calculate the data transfer speed if the code has 8 possible states.
25. A PCM system is employing speech signal having highest frequency of 4 kHz and bandwidth of 64 Kbps and roll factor = 1. Determine :
  - (a) number of bits / level
  - (b) signalling rate in bps
  - (c) total number of levels
  - (d) signal to noise ratio
26. The C/No of a satellite at earth station is given by 150 dB. The earth station's angle of elevation is  $6^\circ$  and receiving figure of merit is 41 dB. Calculate EIRP. Given,  $a = 6370$  km,  $h = 35855$  km and frequency = 10 GHz
27. Determine the number of cells in a cluster with  $i = 3$  and  $j = 4$ . Also calculate reuse distance and reuse factor with radius of each cell is 5 km. What must be the value of radius to double the reuse factor?

**PART - D**

Answer any **FIVE** questions.

**(5 × 2 = 10)**

28. For practical receivers, noise figure is always greater than 1. Justify.
29. If SNR at the output of the receiver is 320, what is the new value of SNR, if noise power is doubled and signal power remains same?
30. What is the output of the system, if modulating signal is integrated first and then applied to phase modulator?
31. In an AM receiver, initial RF selector stage is not required. Why?
32. What is phase delay distortion? How it can be reduced?
33. Only the frequencies above VHF are used in satellite communication. Give reasons.
34. What is the difference between first generation and second generation mobile phones?