B.Tech. DEGREE EXAMINATION, MAY 2017

Third / Fourth Semester

15EC252 – PRINCIPLES OF COMMUNICATION SYSTEMS

(For the candidates admitted during the academic year 2015 – 2016 onwards)

Note:

(i) Part - A should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.

(ii) Part - B and Part - C should be answered in answer booklet.

Time: Three Hours   Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer ALL Questions

1. In AM technique the various of modulation index should be _____ for recovery of base band signal without distortion
   (A) Infinity
   (B) Less than unity
   (C) Greater than unity
   (D) Less than infinity

2. In an amplitude modulated system, if the power in carrier is 400 W, modulation index is unity. Then the total transmitted power is
   (A) 600 W
   (B) 800 W
   (C) 1200 W
   (D) 1600 W

3. _____ is an indirect method of FM generation
   (A) Foster seeley
   (B) Armstrong
   (C) Varactor diode
   (D) Phase shift

4. Which one of the following technique has more noise immunity?
   (A) AM-DSBFC
   (B) AM-DSBSC
   (C) FM
   (D) PM

5. Master oscillator in a receiver generates _____
   (A) Message signal
   (B) Sub harmonic of message signal
   (C) Carrier signal
   (D) Sub harmonic of carrier signal

6. Intermediate frequency value in FM broadcast receiver is _____
   (A) 455 KHz
   (B) 455 KHz
   (C) 10.7 KHz
   (D) 10.7 MHz

7. _____ controls the amplitude fluctuations in FM receivers
   (A) Pre-emphasis
   (B) Limiter
   (C) Harmonic generator
   (D) De-emphasis

8. The frequency range for commercial AM broad cast is _____
   (A) 535-1605 KHz
   (B) 535-1605 MHz
   (C) 88-108 KHz
   (D) 88-108 MHz

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9. In PPM system, the transmitted pulses have
   (A) Constant amplitude, varying width
   (B) Constant amplitude, constant width
   (C) Constant width, varying amplitude
   (D) Varying width, varying amplitude

10. Which of the following modulation is digital in nature?
    (A) PAM
    (B) PPM
    (C) PWM
    (D) PCM

11. _____ standardizes the internet activites
    (A) IEEE
    (B) ITU-T
    (C) ISO
    (D) IAB

12. _____ technique detects 99.9% of all transmission errors
    (A) Check sum
    (B) VRC
    (C) LRC
    (D) CRC

13. Which of the following technique is some times referred to as On-Off keying?
    (A) ASK
    (B) FSK
    (C) PSK
    (D) QPSK

14. The input titrate of 4000 bps for a QPSK modulator has a band equal to _____
    (A) 1000 bps
    (B) 2000 bps
    (C) 4000 bps
    (D) 8000 bps

15. The possible number of output conditions with 'N' input bits can be expressed as
    (A) $M = LOG2^N$
    (B) $M = 2^{N+1}$
    (C) $M = 2^N$
    (D) $M = LOG2^{N+1}$

16. _____ has more bandwidth efficiency
    (A) BPSK
    (B) QPSK
    (C) 8-PSK
    (D) BFSK

17. Microwaves are generally described ad electromagnetic waves with frequencies that range from
    (A) 400 KHz-1600 KHz
    (B) 500 KHz-300 MHz
    (C) 800 MHz-300 GHz
    (D) 88-108 MHz

18. The optical fibre uses_____ portion of EM spectrum
    (A) IR
    (B) VHF
    (C) UHF
    (D) HF

19. The minimum frequency Re-use distance D can be obtained from _____
    (A) $d = 3k.R$
    (B) $d = \sqrt{3k}.R$
    (C) $d = \sqrt{3}k.R$
    (D) $D = \sqrt{3kR}$

20. GSM is based on _____
    (A) FDMA
    (B) TDMA
    (C) CDMA
    (D) SDMA

21. Define modulation index. What is the range of modulation index for AM system?

22. Determine the peak frequency deviation and modulation index for FM modulator with deviation sensitivity 5 KHz/V and modulating signal $3 \cos(2\pi\ 1000\ t)$.

23. What is image frequency? How can we reject the image signal in receivers?

24. Compare various pulse modulation techniques.

25. Write short note on EBCDIC code.

26. For a QPSK system operating with an information bit rate of 24 Kbps. Determine
    (i)   Baud
    (ii) Minimum Bandwidth

27. What is cell splitting and hand-off?

28. a. For an AM DSBFC modulator with a carrier frequency $f_c = 100\,KHz$ and maximum modulating signal $f_m = 10\,KHz$.
    Determine
    (i)   Frequency limits for upper and lower side bands
    (ii) Bandwidth
    (iii) Output frequency spectrum
    (iv) Modulation index for a carrier signal amplitude of 20 V and message signal amplitude of 5 V. Also write the expression for modulation wave

(OR)

   b. Explain indirect method of FM generation with neat diagram.

29. a. Explain AM superheterodyne receiver with neat block diagram.

(OR)

   b. Explain the demodulation of FM signal using Foster Seeley discrimination circuit.

30. a. Explain the generation and demodulation of PAM signal with relevant diagram.

(OR)

   b.i. Explain error correction techniques.

   ii. Explain VRC, LRC error detection techniques with an example.

31. a. Explain Frequency Shift Keying (FSK) technique with relevant diagrams, truth table, constellation diagram.

(OR)

b. Explain the transmission and detection of QPSK signal with necessary block diagram.

32. a. Describe the following
    (i) GSM
    (ii) GPRS

(OR)

b. With an aid of a diagram, discuss about fibre optical communication system. Also mention its advantages.

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