

M. Sc. 3rd Semester Examination, 2023

ELECTRONICS

(Electronic Communication)

PAPER — ELC-301

Full Marks : 50

Time : 2 hours

The figures in the right hand margin indicate marks

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

GROUP—A

Answer any **four** of the following questions : 4 × 2

1. Define the terms noise figure and noise temperature. 1 + 1

2. Explain how image frequency can be removed in a super-heterodyne receiver. 2
3. What do you mean by quantization noise? Write down its maximum value. 1 + 1
4. What is VSB-SC-AM ? Write down its one application. 1 + 1
5. Discuss how an AM signal can be demodulated using coherent detection method. 2
6. What is slope detection method to demodulate an FM signal? 2

GROUP – B

Answer any **four** of the following questions : 4 × 4

7. For an amplitude modulated system prove that $P_t = P_c \left(1 + \frac{m^2}{2}\right)$, where the symbols have their usual meanings. A broadcast radio transmitter radiates 10 kw when the modulation percentage is 60. How much of this is carrier power?

8. Discuss with a neat sketch the principle of operation of a bridge modulator to generate DSB-SC AM. What do you mean by tone modulation? 3 + 1
9. Write down the Carson's law in connection with FM. Discuss, with suitable block diagram how FM can be demodulated using PLL. 1 + 3
10. Write down some advantages of digital communication system over analog communication system. An audio signal is sampled at 8 kHz and each sample is represented by 8 bits. Calculate the minimum channel capacity required for that system. 3 + 1
11. State and prove the sampling theorem. 1 + 3
12. Write down the differences between Delta modulation and DPCM. What are the differences between TDM and TDMA? 2 + 2

GROUP - C

Answer any **two** of the following questions : 2×8

13. Explain the terms FSK, ASK and PSK. With a neat sketch discuss the modulation and demodulation processes of QAM. What is BER? $3+4+1$
14. With a neat sketch discuss the working principle of a Armstrong wide band FM generator. What do you mean by pre-emphasis and de-emphasis in connection with an FM system? Briefly discuss a direct method of FM generation. $4+2+2$
15. With a neat sketch explain the phase-shift method of SSB-SC AM generator. Indicate some of its limitations. With proper circuit diagram discuss how can you demodulate an AM wave using envelope detector. How can you select the values of 'R' and 'C' ? $3+1+(3+1)$

16. What is CRC method to detect error in digital network? What is Hamming code and how can check and correct error using it? Write down the function of modem in a digital communication system. What do you mean by IOT ? 2+(1+2)+2+1

[Internal Assessment – 10 Marks]
