

Roll No.

Total Pages : 03

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B. Tech. EXAMINATION, 2022

Semester IV (CBCS)

ANALOG COMMUNICATIONS

EC-401

Time : 3 Hours

Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

1. What is Communication System ? Explain Transmitter and receiver with its block diagram. **10**

2. A signal $e^{-3t}u(t)$ is passed through an ideal low pass filter with cut-off frequency of 1 rad per second. (a) test whether the input is an energy signal, and (b) find the output energy. **10**

Section B

3. Describe briefly the forms of noise to which a transistor is prone. **10**
4. A box contains 3 White, 4 Red and 5 Black balls. A ball is drawn at random. Find the probability that it is (a) Red, (b) not Black (c) Black or White. **10**

Section C

5. Derive the relation between the output power of an AM transmitter and the depth of modulation and plot its graph for values of the modulation index from zero to maximum. **10**
6. A DSB modulated signal $\phi(t) = Am(t)\cos 2\pi f_c t$ is multiplied with a local carrier $c(t) = \cos(\omega_c t + \theta)$ and the output is passed through a LPF with a bandwidth equal to the bandwidth of the $m(t)$. If the power of the message signal $m(t)$ is P_M . Determine :
- (a) The power of the modulated signal. **5**
- (b) The power of the signal at the output of the LPF. **5**

Section D

7. Describe the Direct method and Indirect method for Angle generation of FM. **10**
8. Explain spike generation and threshold effect in FM in detail. **10**

(Compulsory Question)

9. Answer the following : **2×10=20**
- (a) Explain Electromagnetic spectrum and its range.
- (b) Give the properties of energy and power spectral density.
- (c) Define Noise Temperature.
- (d) Define signal to noise ratio of a receiver.
- (e) What are the types of internal noise ?
- (f) Explain Random process.
- (g) Explain correlation and covariance function.
- (h) What is Ergodic process ?
- (i) What is Super heterodyne receiver ?
- (j) Explain deviation ratio.