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Sardar Patel University

B.Sc. (semester-III) Examination Nov -2022

Paper Code: US03CELC52

Paper Title: Analog Communication

Date: 21/11/2022; Monday

Time: 10:00 am TO 1:00 pm

Maximum Marks: 70

**Q-1 Multiple Choice Questions. (10)**

1. The highest modulation frequency typically used in AM broadcast is \_\_\_\_\_.
  - a) 5 KHz
  - b) 10 KHz
  - c) 15 KHz
  - d) 455 KHz
2. The energy content of atmospheric noise varies as \_\_\_\_\_.
  - a)  $1/f$
  - b)  $2f$
  - c)  $f^2$
  - d)  $3f$
3. \_\_\_\_\_ is the random noise generated in a resistor or resistive component of a complex impedance due to rapid and random motion of molecule, atom and electrons.
  - a) Cosmic noise
  - b) Thermal noise
  - c) Man made noise
  - d) Atmospheric noise
4. \_\_\_\_\_ circuit is extremely popularly used in commercial radio receiver.
  - a) Base modulation
  - b) Square law diode detector
  - c) collector modulation
  - d) Linear diode detector
5. Linear diode modulation uses \_\_\_\_\_.
  - a) Rectification property of Diode
  - b) Capacitive property
  - c) linear region of dynamic voltage-current characteristics
  - d) Non linear portion of the dynamic characteristics of diode
6. Negative peak clipping in a linear diode detector results due to \_\_\_\_\_.
  - a) too high value of the time constant RC
  - b) too low value of the time constant RC
  - c) peak modulation voltage
  - d) low modulation voltage
7. RC inductive reactance tube behaves as capacitive value  $C_e =$  \_\_\_\_\_.
  - a)  $\frac{gmL}{R}$
  - b)  $gmL$
  - c)  $\frac{gm}{R}$
  - d)  $\frac{L}{R}$
8. The critical frequency is proportional to the \_\_\_\_\_ of the maximum electron density in the layer.
  - a) double
  - b) square root
  - c) thrice
  - d) half
9. The power pattern is proportional to the \_\_\_\_\_ of the field strength pattern.
  - a) half
  - b) square root
  - c) double
  - d) square
10. Ground waves are also known as \_\_\_\_\_ as the wave propagates close to the surface of earth.
  - a) tropospheric wave
  - b) Space wave
  - c) Surface wave
  - d) none

[1]

(P.T.O.)

- Q-2 Answer in short. (Any Ten) (20)**
1. What is Modulation? why we need Modulation?
  2. What is meant by term "Noise" in communication.
  3. Explain Thermal noise.
  4. Differentiate Resistance, Reactance and Impedance.
  5. Give the classification of Linear modulation methods..
  6. What do you meant by Square law diode detector?
  7. What is meant by reactance tube modulation?
  8. What is the difference between varactor diode and rectifier diode?
  9. Draw the equivalent circuit of Capacitive FET.
  10. Explain the main two basic function of the Antenna.
  11. What is the application of Space wave propagation?
  12. List the factor that affected the magnitude of the space wave.

- Q-3 A Define Frequency modulation. Derive the expression for the frequency modulated voltage with necessary diagram. (06)**
- B Write a short note on : Atmospheric Noise (04)**

**OR**

- A Define Amplitude modulation. Derive the expression for the amplitude modulated voltage with necessary diagram. (06)**
- B Give the classification of RF spectrum. (04)**

- Q-4 Draw the circuit of a linear diode detector using a simple capacitor filter and describe graphically the detection process perform by the circuit. (10)**

**OR**

**Explain why the time constant RC of a load circuit in a linear diode detector cannot be kept too high or low in detail. (10)**

- Q-5 A Explain Frequency modulation using varactor with necessary diagram. (06)**
- B Draw the circuit of Slope detector and explain its working. (04)**

**OR**

- A Draw the circuit of an R-C capacitive reactance FET and obtain expression for the effective capacitance  $C_e$  offered by FET between drain and source terminals. (06)**
- B Write a short note on : Ratio detector. (04)**

- Q-6 A Explain function and process of antenna action with necessary diagrams. (06)**
- B Write short note on : Ground wave propagation. (04)**

**OR**

- A Explain Thin liner antenna in detail. (06)**
- B Write short note on sky wave propagation. (04)**

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