

**Instructions:**

1. Question No: 1 is compulsory.
2. Answer any **three** of the remaining five questions.
3. Answers to questions should be grouped and written together.

- 1** Attempt any **four** of the following: **(5 x 4)**
- a) What is the need for biasing in BJT amplifiers?
  - b) Draw and explain the transfer characteristics of n-channel depletion type MOSFET.
  - c) Explain the diode as a positive shunt clipper.
  - d) Explain the working of op-amp as a zero crossing detector.
  - e) Discuss the working of the Zener diode as a voltage regulator.
- 2** a) Determine  $I_{CEQ}$  and  $V_{CEQ}$  for a voltage divider bias circuit having  $V_{CC}=16$  V,  $R_1 = 90K\Omega$ ,  $R_2 = 10K\Omega$ ,  $R_C = 2.2K\Omega$ ,  $R_E = 0.68K\Omega$ ,  $\beta = 210$ . **(10)**
- b) Explain the construction and working of n-channel depletion MOSFET with a neat diagram. **(10)**
- 3** a) Explain op-amp as a Schmitt trigger circuit. Draw the hysteresis curve. **(10)**
- b) Draw the hybrid equivalent model for an emitter bias CE amplifier and derive the expression for voltage gain. **(10)**
- 4** a) What are the different DC biasing techniques used for MOSFET? Analyze any two methods in detail. **(10)**
- b) Explain the construction and working of the Schottky diode. **(10)**
- 5** a) Analyse full wave bridge rectifier circuit with LC filter. Draw necessary waveforms. **(10)**
- b) Explain op-amp as inverting summer circuit. **(10)**
- 6** a) Illustrate the working of IC555 as an Astable multivibrator. **(10)**
- b) Discuss the working of the LM317 voltage regulator IC. **(10)**
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