[Time:3 Hours] **[Total Marks: 80]**

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 = 90KΩ, R_2 = 10KΩ, R_C = 2.2KΩ, R_E = 0.68KΩ, β = 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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