# 22346

## 12425 3 Hours / 70 Marks

Seat No.

*Instructions* : (1) All Questions are *compulsory*.

- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary.

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### 1. Attempt any FIVE of the following :

- (a) State the formula of current amplification factor in CE & CC configurations.
- (b) Write the conduction angle in Class-A, Class-B, Class-AB & Class-C power amplifier.
- (c) Identify following feedback connection & convert it into voltage shunt feedback connection.



- (d) State the type of feedback. Write one advantage and disadvantage of each.
- (e) Write two examples of linear & non-linear wave shaping circuit.
- (f) Draw block diagram of regulated power supply.
- (g) Write IC no. for + 12 V, -5 V, -12 V, + 5 V power supply.



**P.T.O.** 

#### 2. Attempt any THREE of the following :

- (a) Draw output characteristics of BJT in CB configuration & label the operating regions. Write status of B-C & B-E junctions in each region.
- (b) Draw drain & transfer characteristics of EMOSFET. Also label the different regions.
- (c) Explain the crossover distortion. How it is overcame, show with circuit diagram.
- (d) Draw circuit diagram of FET self bias. Explain its working principle.

#### **3.** Attempt any THREE of the following :

- (a) Draw constructional diagram of NPN BJT & explain the working.
- (b) Compare FET & BJT on the basis of (i) input resistance (ii) output current controlling parameter (iii) power dissipation (iv) current carriers.
- (c) Draw circuit diagram of RC phase shift oscillator. Explain how Barkhausen's criteria fulfill.
- (d) The negative half cycles are to be clipped from given input signal ( $V_i = 5 \sin wt$ ), name & draw the circuit with input-output waveform.

#### 4. Attempt any THREE of the following :

- (a) Draw and explain voltage divider biasing ckt in BJT.
- (b) An n-channel JFET has  $I_{DSS} = 8$  mA and  $V_P = -4$  V. If  $I_D = 3$  mA. Calculate the value of  $V_{GS}$ .
- (c) Single transistor is operating as an ideal class-B amplifier with 10 k $\Omega$  load. A dc meter in the collector reads 100 mA. How much signal power is delivered to the load ?

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(d) A three stage amplifier has a first stage voltage gain 100, second stage voltage gain 200 and third stage voltage gain 300. Find the total voltage gain in dB. Also calculate bandwidth of given frequency response of amplifier.



(e) Design regulated dual power supply for  $\pm 12$  V using regulator ICs.

#### 5. Attempt any TWO of the following :

- (a) State the need of biasing of the transistor. Draw circuit diagram of fixed bias for BJT and write the functions of each component.
- (b) Draw circuit diagram and frequency response of R-C coupled amplifier. Write its drawbacks.
- (c) Draw circuit of RC differentiator for a sinusoidal input. Derive the expression for output voltage. In case if the same circuit is connected to a square wave signal generator, draw the output waveform.

#### 6. Attempt any TWO of the following :

(a) Calculate the bandwidth and gain with 4 percent negative feedback, if amplifier has bandwidth of 100 kHz and voltage gain of 50. Also draw block diagram of current series feedback connection. 12

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- (b) The dc level of 5 V is to be added to the given input signal ( $V_{in} = 10 \sin wt$ ). Explain the working principle of this application along with the circuit diagram and input-output waveforms.
- (c) Design a complete regulated power supply to drive an amplifier to give + 8V regulated output using IC 78XX. Write the function of rectifier & filter circuit used in power supply.