B.Sc.S.Y. (With Credits)-Regular-Semester 2012 Sem III

B.Sc.23131 : Electronics : Paper-I (Amplifiers)

P. Pages : 2 **GUG/W/16/3336**

Time : Three Hours * 4 2 7 5 * Max. Marks : 50

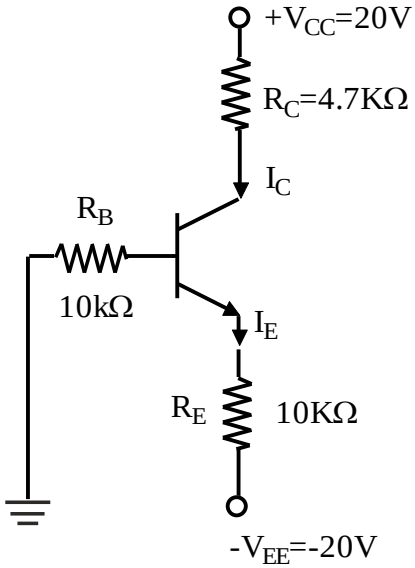
Notes : 1. All questions are compulsory and carry equal marks.
2. Draw neat and well labelled diagram wherever necessary.
3. Use of log table / calculator is allowed.

EITHER:

1. a) Explain function of transistor as an amplifier. Why is it generally beneficial for an amplifier to have a high input resistance ? Explain Determine the input resistance of the amplifier when an input voltage of the source, Vs to provide an amplifier input voltage Vi of 0.25V. When the internal resistance of the source is 50Ω? **10**

OR

b) State various methods used for transistor biasing. Explain any one of them. For the emitter bias circuit shown below, find operating point Q for $\beta = 85$ and $V_{BE} = 0.7V$. **10**



EITHER:

2. a) Draw circuit diagram of two stages transformers coupled amplifier and explain its frequency response. **10**

A loudspeaker has a resistance of 10Ω and is coupled through transformer to the output stage of an amplifier. If the output impedance of amplifier is 1kΩ, Find the turn ratio of the transformer so that maximum power is transferred to the loudspeaker.

OR

b) Derive an expression for voltage amplification of RC coupled amplifier for low frequency range. **10**

Show that lower cut off frequency is given by.

$$f_1 = \frac{1}{2\pi\, c(hie + R_L)}$$

EITHER:

3. a) Draw block diagram of operational amplifier. Explain why a difference amplifier is used as a building block for OP-AMP. **10**
State at least four characteristics of ideal OP-AMP.

OR

b) Draw OP-AMP symbol with proper labels. Explain the following parameters of OP-AMP; **10**
i) Differential mode gain (Ad),
ii) Common mode gain (Ac),
iii) Input bias current (I_B) and
iv) Input offset voltage (V_{IO}).

EITHER:

4. a) What is Schmitt trigger? **10**
Explain UTP, LTP and hysteresis of Schmitt trigger. State its advantages over usual comparator.

OR

b) Explain the concept of virtual ground. Derive the formula for output voltage of inverting amplifier, using OP-AMP. Inverting amplifier uses 20kΩ input series resistor and 80kΩ feedback resistor. If output is -4V, find the input voltage. **10**

5. a) Define h-parameters of a transistor in CE mode. **2½**

b) State types of distortion in amplifier. Explain any one of them. **2½**

c) Find slew rate of OP-AMP if the output voltage of OP-AMP changes from -12V to 12V in 4 μsec. **2½**

d) Using OP-AMP, design a circuit that represents the following equations. **2½**
$V_0 = A_2 V_2 - A_1 V_1$.

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