

Con. 9733-13.**LJ-10522**

(3 Hours)

[Total Marks : 100

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** out of remaining **six** questions.
 (3) Assume suitable **data** if required.

1. (a) Explain the Barkhausen criterion for oscillators. **5**
 (b) Explain the Miller effect on BJT amplifier. **5**
 (c) What do you mean by virtual ground concept ? **5**
 (d) What is cross over distortion in power amplifiers ? **5**

2. (a) Design a two stage RC coupled CE amplifier using BC 147B for the given **20**
 specifications.
 $V_{CC} = 16\text{ V}$, overall gain (A_v) = 10000, $S \leq 10$, $FL = 15\text{ Hz}$, $h_{ie} = 4.5\text{ k}\Omega$, $h_{oe} = 30\text{ M}\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe}(\text{min}) = 240$, $h_{fe}(\text{typ}) = 330$, $h_{fe}(\text{max}) = 290$.

3. (a) Explain the darlington pair amplifier and derive the dc bias voltages and current. **10**
 Also explain why darlington connection is known as superbeta transistor.
 (b) Explain RC coupled cascaded amplifier and discuss the advantages and disadvantages **10**
 with Transformer coupling.

4. (a) Derive the condition for getting sustained oscillation in wein bridge oscillator. **10**
 (b) Explain the UJT relaxation oscillates. Also derive the frequency of getting sustained **10**
 oscillation to UJT relaxation oscillator.

5. (a) Differentiate between integrator and Differentiat or circuit using op amp. **10**
 (b) Explain the block diagram IC741. Also explain the parameters of op amp. **10**

6. (a) Explain the operation of Transformer coupled class A amplifier and find the **10**
 expression for efficiency. Prove that the maximum efficiency is 50% only.
 (b) Design a class A power amplifier for the following specification. **10**
 $P_o = 5\text{ W}$, $R_L = 6\Omega$, $S \leq 8$, $V_{CC} = 12\text{ V}$
 Use ECNO55 transistor with the following specifications.
 $P_D \text{ max} = 50\text{ w}$ at 25°c
 $I_C \text{ max} = 5\text{ A}$ at 25°c
 $V_{CE} \text{ max} = 50\text{ V}$ $T_j \text{ max} 200^\circ\text{c}$

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7. (a) Using op-amp realise.

10

(i) $V_o = 5V_1 + 4V_2 - 3V_3$

(ii) Calculate the output voltage (V_o) for the circuit in fig.1

The inputs are

$V_1 = 50 \sin(1000 t) \text{ mv}$

$V_2 = 10 \sin(3000 t) \text{ mv}$

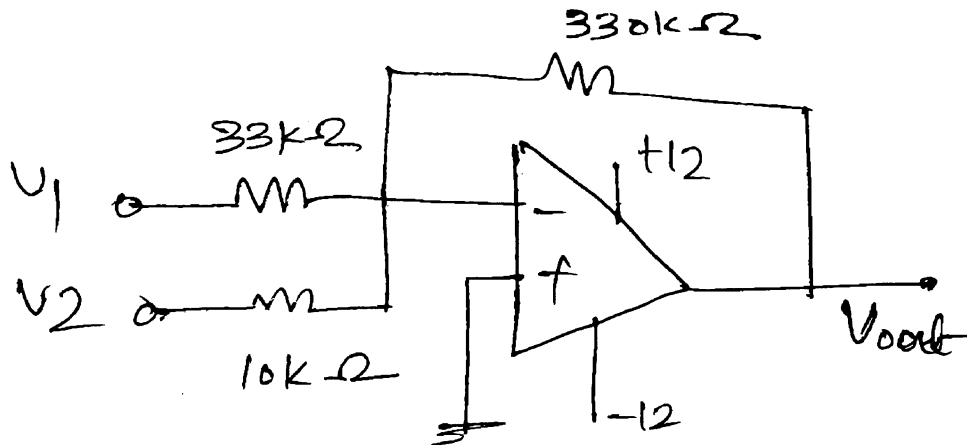


fig.1

(b) Explain the effect of negative feedback with input impedance, voltage gain on voltage shunt and voltage series feedback amplifiers. 10