

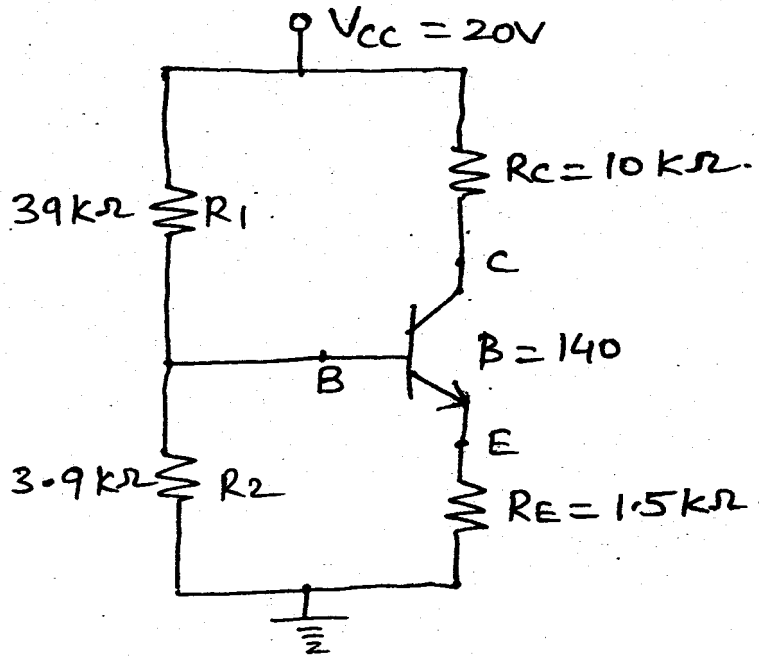
Con. 3046-11.

(3 Hours)

[Total Marks : 100

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

1. (a) List the characteristic features of 555 timer. 20
 (b) Explain operational amplifier with a neat block diagram.
 (c) With a neat circuit diagram explain voltage follower and draw input-output waveforms.
 (d) Explain series voltage regulator.
2. (a) Draw small-signal n-parameter model of the BJT and define the terms h_{ie} , h_{re} , h_{fe} and h_{oe} for the same. 8
 (b) Determine the following for the circuit shown in figure below :- 12
 (i) I_{BQ} (ii) I_{CQ} (iii) V_{CEQ} (iv) V_{CQ} (v) V_{EQ} (vi) V_{BQ} .
 Use both, Exact and approximate analysis to solve the same.



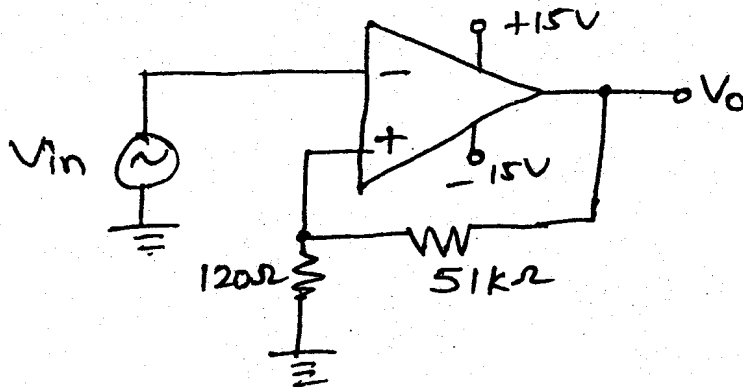
3. (a) Derive equations for Z_i , Z_o , A_v for common source configuration using voltage divider network (with unbypassed R_s). 10
 (b) Explain Instrumentation Amplifier using IC 741. Derive the expression for V_o . 10

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4. (a) Explain in detail any two applications of a monostable multivibrator. 10
 (b) Explain the digital ramp ADC with a neat block diagram. 10
5. (a) Design a regulator using IC 723 to meet the following specifications :- 10
 $V_o = 5V$; $I_o = 100 \text{ mA}$
 $V_{in} = 15 \pm 20\%$
 $I_{sc} = 150 \text{ mA}$
 $V_{sense} = 0.7V$
- (b) Explain successive Approximation Resistor A/D converter. 10
6. (a) For a Schmitt trigger shown in the figure, calculate threshold voltage levels 10
 and hysteresis. Assume $V_{sat} = 0.9 V_{cc}$.



- (b) Explain op-amp as an Practical Integrator. 10
7. Write short notes on any two :- 20
 (a) PLL
 (b) Inverting Schmitt trigger
 (c) Zero Crossing Detector
 (d) D/A converter using R-2R resistors.