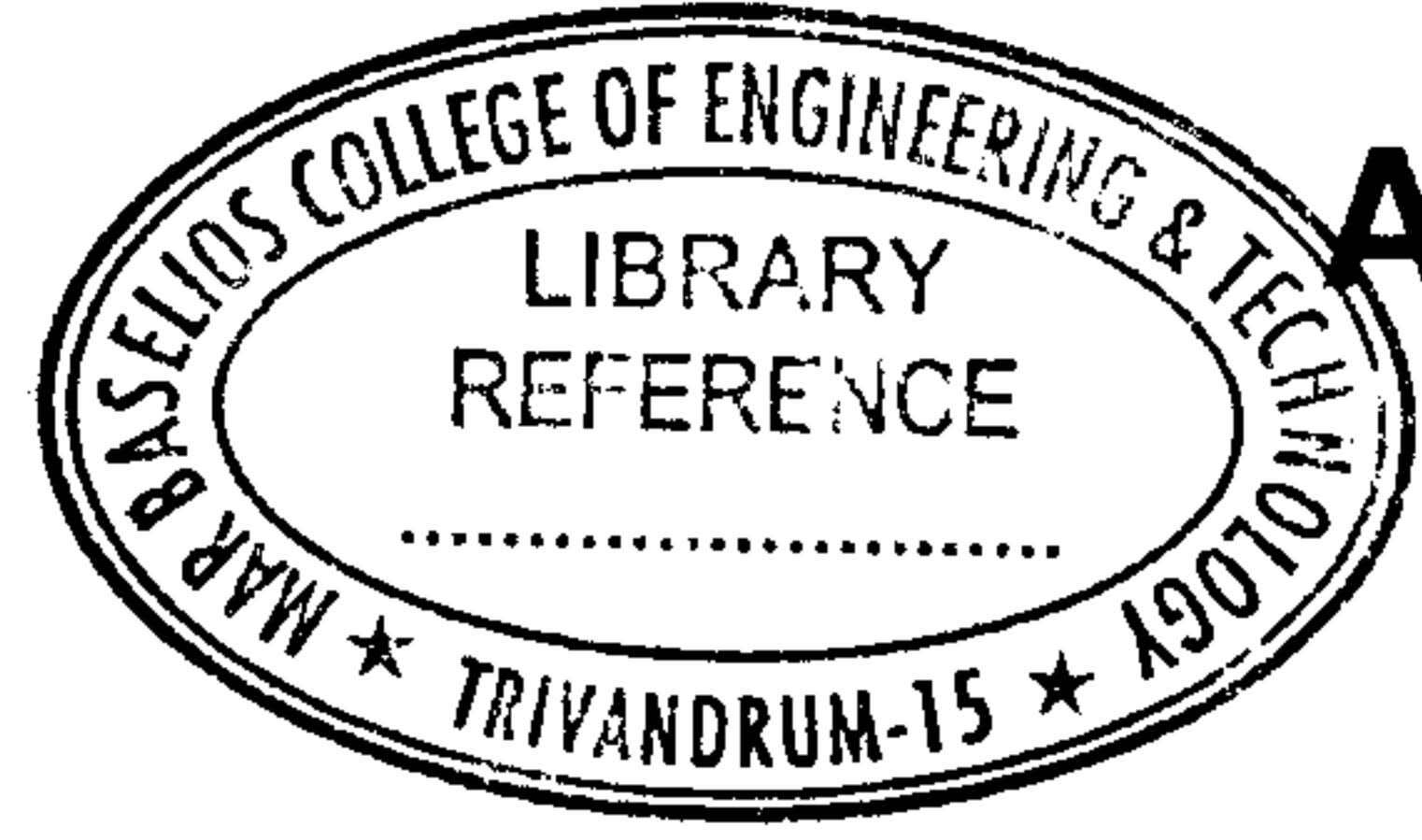




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A – 6588

Reg. No. :

Name :

**Third Semester B.Tech. Degree Examination, October 2016
(2013 Scheme)
13.305 : ELECTRONIC CIRCUITS (T)**

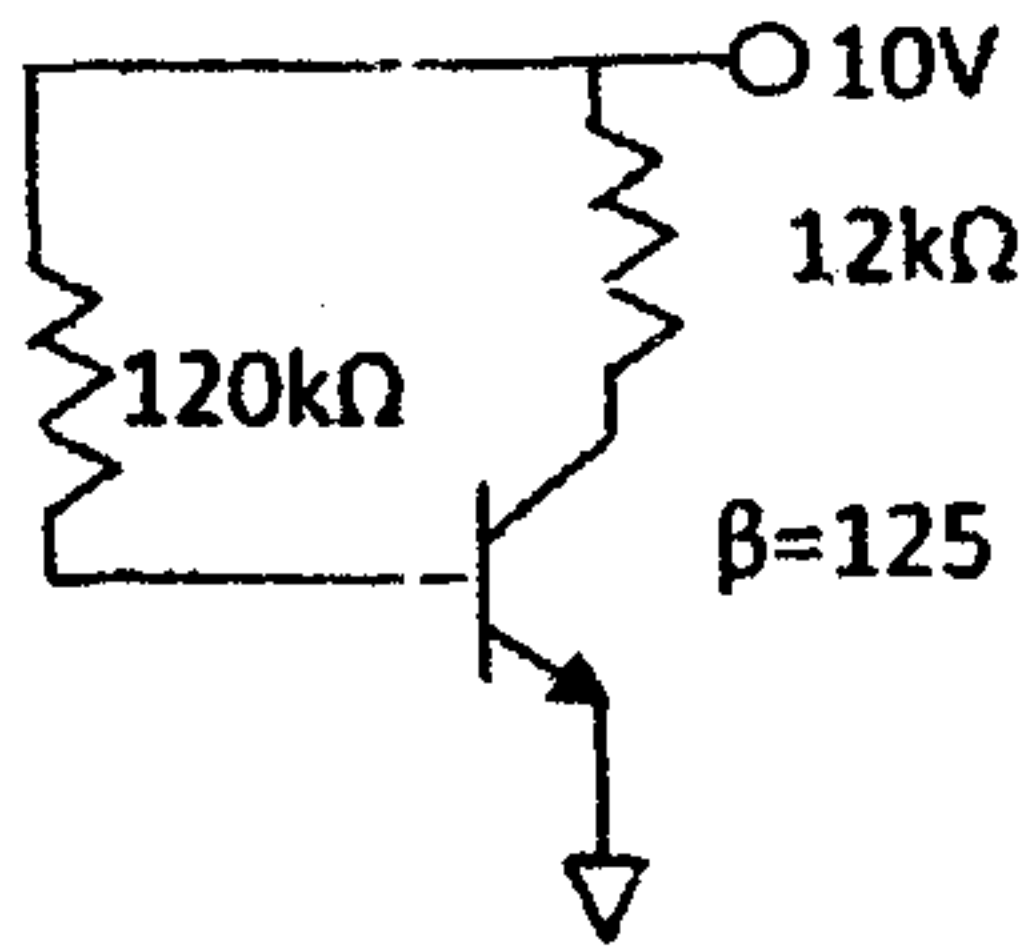
Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks :

1. Draw the dc load line of the circuit given below :



2. Draw a clipper circuit which clips all voltages above + 2V.
3. Define :
 - i) rise time
 - ii) fall time.
4. Draw a simple MOS current mirror and write the expression for the output current.
5. Define CMRR. How to improve it ?
6. Compare Common-Source, Common-Drain and Common-Gate Amplifiers based on their characteristics.
7. An amplifier has a voltage gain of 1000. With the negative feedback, the voltage gain reduces to 10. Calculate the fraction of the output that is feedback to the input.
8. Write the expressions for series and parallel resonant frequencies of crystal oscillator.
9. Draw the block diagram of a power supply.
10. List the conduction periods of Class A, Class B and Class C amplifiers. **(10×2=20 Marks)**

P.T.O.



PART – B

Answer **any one** question from **each** Module.

Module – I

11. a) With a circuit diagram and waveforms, explain the working of a positive clamping circuit. 6
- b) What is the need for biasing ? Design a voltage divider bias circuit for the given specifications : $V_{CC} = 12V$, $V_{CE} = 6V$, $I_C = 1mA$, $S = 20$, $\beta = 100$ and $V_E = 1 V$. 10
- c) Explain the operation of differentiator circuit with neat sketch. 4
12. a) Study the behaviour of the CE amplifier with resistive load at high frequencies and obtain upper cut off frequency and bandwidth. 10
- b) With neat sketch explain hybrid π CE transistor model. Derive the expression for various components in terms of 'h' parameters. 10

Module – II

13. a) Determine the differential and common mode gains of a differential amplifier : $V^+ = 10V$, $V^- = -10V$, $I_Q = 0.8mA$, $R_C = 12K\Omega$, $\beta = 150$, $R_o = 22K\Omega$, $V_A = \infty$, source resistance $R_B = 0$. Use one sided output at V_{C2} . 8
- b) How is the CMRR improved in a differential amplifier circuit ? 6
- c) Determine the input and output impedance of common gate amplifier. 6
14. a) Explain the small signal equivalent circuit of the MOSFET and determine the values of small signal parameters. 10
- b) Sketch and describe the advantages of a MOSFET cascode current source used with a MOSFET differential amplifier. 10

Module – III

15. a) A voltage-series negative feedback amplifier has a voltage gain without feedback as $A = 500$, input resistance $R_i = 3k\Omega$, output resistance $R_o = 20 k\Omega$ and feedback ratio $\beta = 0.01$. Identify the voltage gain A_f , input resistance R_{if} and output resistance R_{of} of the amplifier with feedback. 10



- b) Develop the circuit diagram of a two-stage synchronously tuned amplifier and also its equivalent circuit. Derive the expression for bandwidth. 10
- 16. a) Draw Wein Bridge Oscillator using BJT. Explain and derive the condition for Oscillation. 10
- b) In Colpitt's Oscillator $C_1 = 1\text{nF}$ and $C_2 = 0.2\mu\text{F}$. If the frequency of oscillation is 10 KHz, find the value of inductor. Also find the required gain for sustained oscillation. 4
- c) Determine the trans-conductance gain, input impedance and output impedance of BJT based single-stage current-series amplifier. 6

Module – IV

- 17. a) Explain the bootstrap sweep circuit with neat sketch. 10
- b) Sketch the circuit of a class B transformer coupled amplifier and derive the equations for dc input power to the output stage, ac power delivered to the transformer primary and circuit efficiency. Also show that the maximum theoretical efficiency of a class B amplifier is 78.6%. 10
- 18. a) Describe line and load regulation of series voltage regulator. 8
- b) Derive the ripple factor for full wave rectifier with two LC filters connected in cascade. 8
- c) Write a brief note on short circuit protection. 4

