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Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, December 2015
(2008 Scheme)
08.305 : ELECTRONIC CIRCUITS – I (TA)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions.

1. Draw the piecewise linear model of a diode under different conditions.
2. Obtain stability factor of a transistor circuit biased using fixed bias arrangement.
3. What are the performance measures of a regulator ? Explain.
4. Obtain an expression for tilt in a RC high pass circuit.
5. Compare the performance of L, C, LC and π section filters.
6. Explain various switching parameters when BJT is used as a switch.
7. List some of the features of MOSFET.
8. Draw the hybrid π model of a BJT and explain.
9. What is a power amplifier ? What are the design considerations ? Explain.
10. The current gain of a BJT circuit is 100 at 5 MHz. What is the value of fT ? What current gain will be offered by the circuit when it is operated at 25 MHz ?

(10×4=40 Marks)

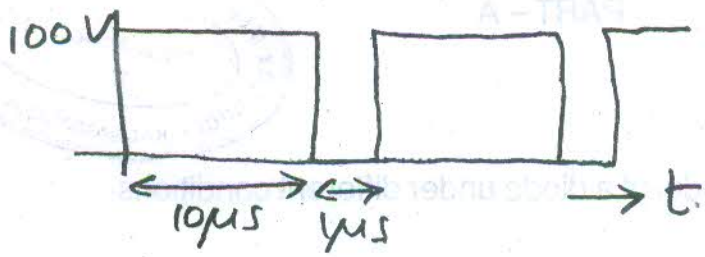
P.T.O.

PART – B

Answer **two** questions from **each** Module. **All** questions carry **equal** marks.

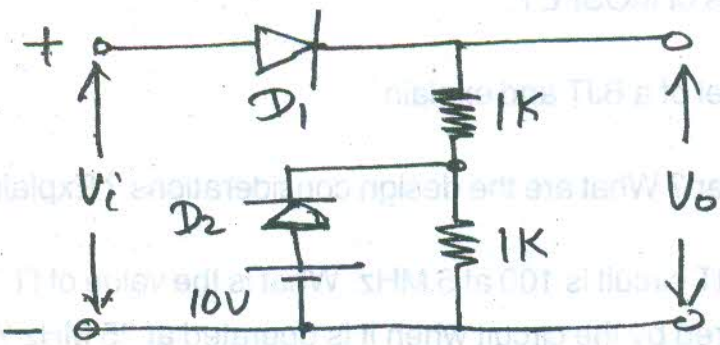
Module – I

11. The periodic waveform shown below is applied to an RC integrating network whose time constant is 10 μ sec. Sketch the output. Calculate the maximum and minimum values of output voltage with respect to ground.



12. A bridge rectifier uses a power transformer of turns ratio 10 : 1. RMS input voltage to the transformer is 230 V and is of 50 Hz. Secondary winding resistance of the transformer is 6 Ω, and on-resistance of each diode is 2Ω. If the load resistance of the rectifier is 40Ω, calculate the dc output voltage, rms output voltage, ripple factor and efficiency.

13. a) Plot the transfer characteristics for $0 < V_i < 15$. Assume ideal diodes.



b) How does a high-pass RC circuit act as a differentiator ?

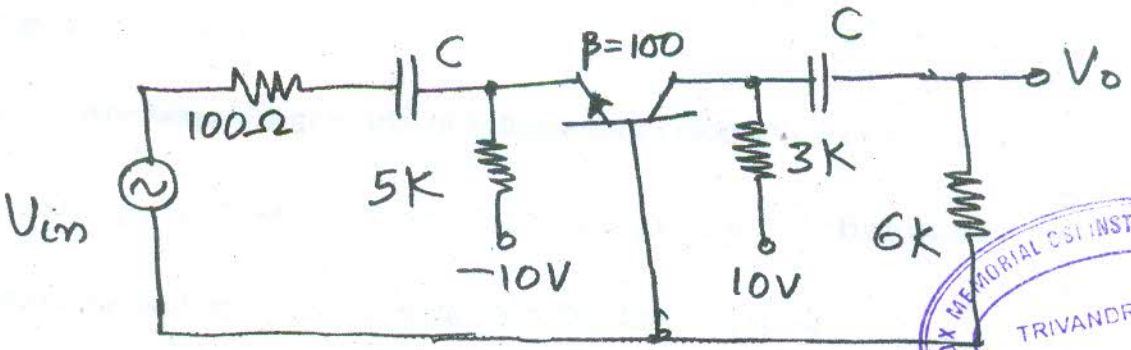
Module – II

14. Design an RC coupled amplifier in class A for a voltage gain of – 40. Choose transistor with $V_{cc} = 6V$, $I_c = 1mA$ and $\beta = 100$.

15. a) Draw and explain a source self bias of a MOSFET amplifier.

    b) Draw the three configurations CG, CD and CS of MOSFET amplifier. State their important properties.

16. Calculate the dc emitter current, the voltage gain and input impedance of the following amplifier circuit.



Module – III

17. Draw the circuit of an emitter follower. Draw its high frequency equivalent circuits and obtain expressions for dominant pole frequency.

18. A MOSFET has a drain resistance of (R_D) 100 K and operates at 2 KHz. The parameters are $g_m = 1.6$ mA/V, $r_d = 14$ K, $C_{gs} = 3$ pF, $C_{ds} = 1$pF and $C_{gd} = 2.8$ pF. Calculate voltage gain and 3 dB frequency (upper) if it is configured as a CS amplifier.

19. a) A first order circuit having a gain of 10 at dc and a gain of 1 at infinite frequency has its pole at 10 KHz. Find the transfer function.

    b) Analyse a class B push-pull output stage and obtain expression for maximum conversion efficiency. **(6×10=60 Marks)**