



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  $\pi$  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  $\pi$  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  $f_T$  ? What current gain will be offered by the circuit when it is operated at 25 MHz ?

(10×4=40 Marks)



P.T.O.

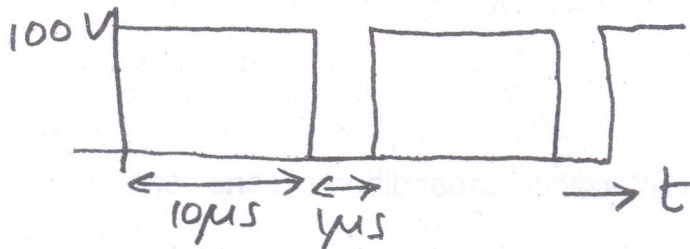


## PART - B

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

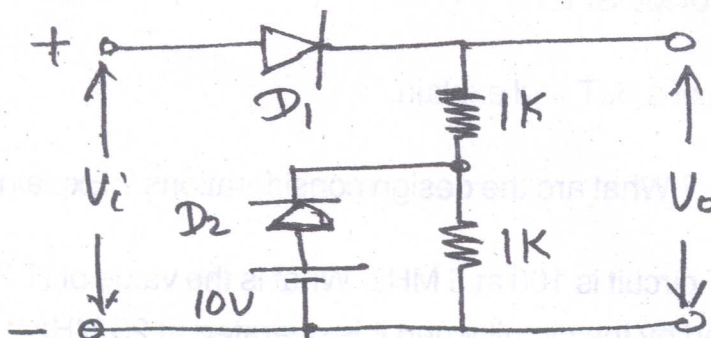
## Module - I

11. The periodic waveform shown below is applied to an RC integrating network whose time constant is  $10 \mu\text{sec}$ . 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  $230 \text{ V}$  and is of  $50 \text{ Hz}$ . Secondary winding resistance of the transformer is  $6 \Omega$ , and on-resistance of each diode is  $2 \Omega$ . If the load resistance of the rectifier is  $40 \Omega$ , 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.

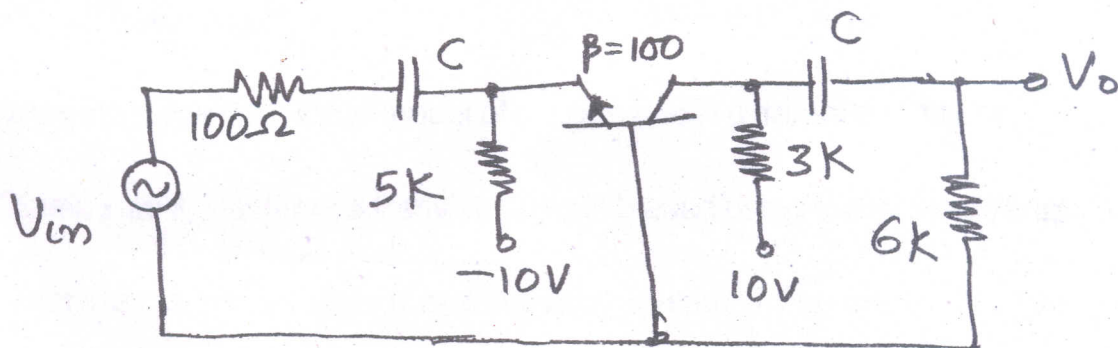


- b) How does a high-pass RC circuit act as a differentiator ?



**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. **(6x10=60 Marks)**