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F – 2211

Reg. No. : .....

Name : .....

Third Semester B.Tech. Degree Examination, December 2018
(2008 Scheme)
08.305 : ELECTRONIC CIRCUITS – I (T)

Time : 3 Hours Max. Marks : 100

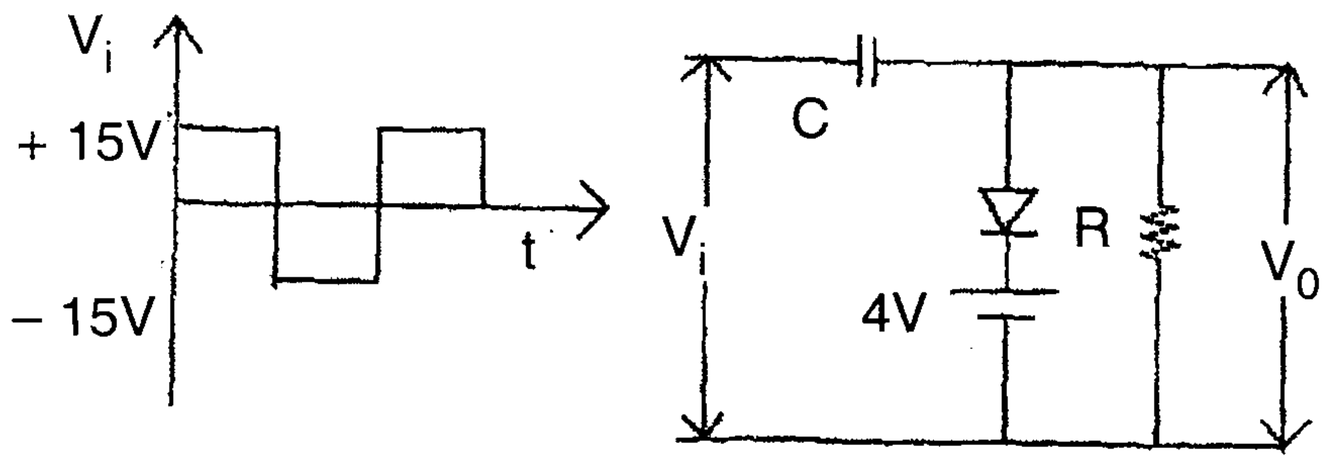
PART – A

Answer **all** questions. **Each** question carries **4** marks.

1. Explain how a low pass RC circuit can be used as an integrator. Write the condition to get perfect integration.

2. Obtain 3dB frequency of high pass circuit.

3. For the clamping circuit shown, sketch the output waveform.

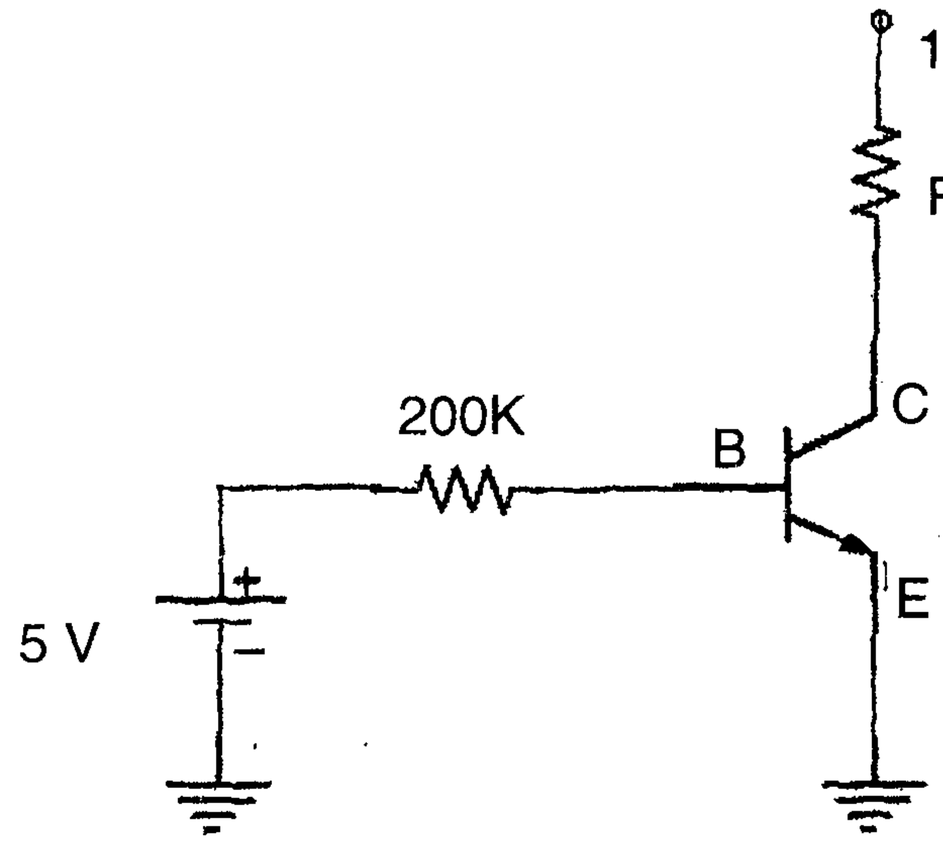


4. Compare the performance of C, L and LC filters.

5. What is thermal runaway ?

P.T.O.

6. A silicon transistor with $V_{BE(sat)} = 0.8$ V, $\beta = h_{fe} = 100$, $V_{CE(sat)} = 0.2$ V is used in the circuit shown. Find the minimum value of R_C, for which the transistor remains in saturation.



7. What is the need for bias stabilization ? Explain any one biasing technique of BJT.

8. Explain drain to gate bias for an enhancement MOSFET.

9. For an n-channel FET, the parameters are $I_{DSS} = 20$ mA, $V_p = -2.5$ V and $\lambda = 0$. What is the value of V_{GS} when $I_D = 1.2$ mA and the transistor is biased in the saturation region ?

10. What is cross over distortion ? How it can be eliminated ? **(10×4=40 Marks)**

PART – B

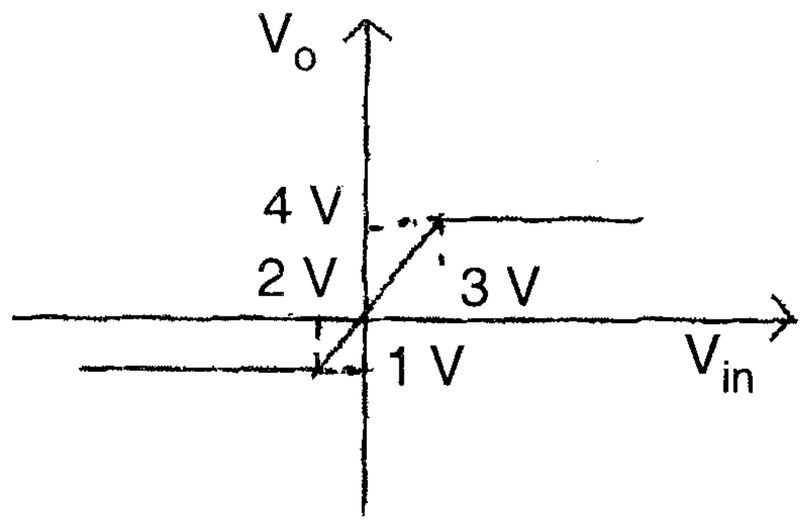
Answer **any two** questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. A full wave rectifier (2 diode circuit) uses a load resistance of 1.2 kΩ. The transformer secondary voltage from centre tap to one end is 30 V, 50 Hz. For the diodes, forward resistance is 10 Ω and reverse resistance infinity. Calculate
    a) dc and rms load current
    b) dc power output
    c) rectification efficiency
    d) % regulation
    e) Transformer secondary rating.

12. Explain the working of a series voltage regulator. Obtain an expression for its output voltage. How do you provide short circuit protection in the circuit ?

13. a) Design a circuit to obtain the following transfer characteristics.

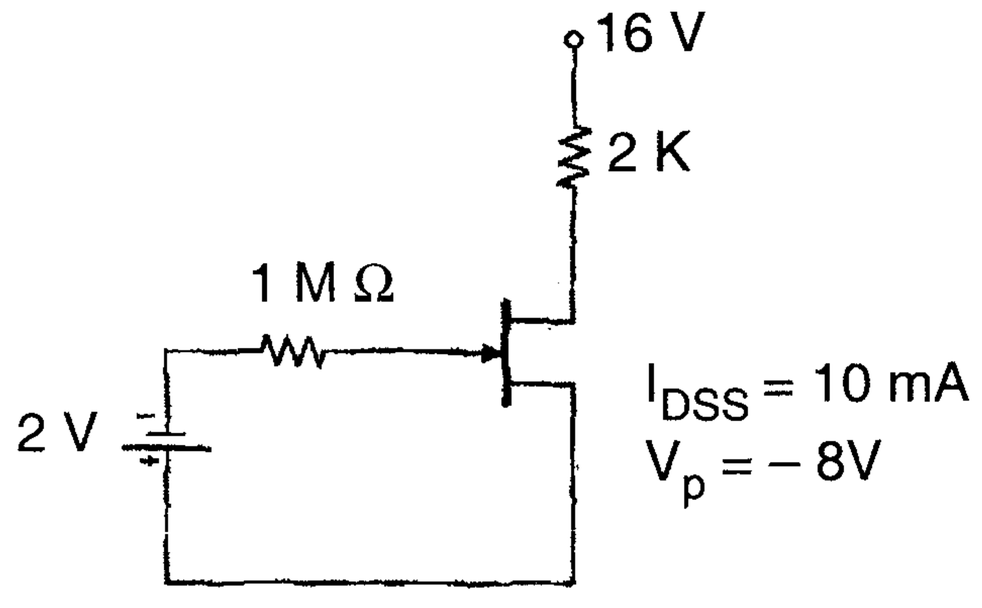


b) Plot the response of a low pass RC circuit to produce a periodic square wave after deriving necessary equation.

Module – II

14. Draw the circuit diagram of common source amplifier. Draw its DC and AC equivalent circuits. Derive a mathematical expression for A_v, R_o, R_i.

15. Determine the operating point of the FET.



16. Design an RC coupled amplifier for a gain of 50. Assume V_{CC} =10 V, V_{BE} = 0.6 V, β = 100, I_C = 2 mA, V_{CE} = 50% of V_{CC}.

Module – III

17. Analyse the high frequency response of CD amplifier and derive the expression for voltage gain.

18. For a class B push pull power amplifier, $V_{CC} = 2$ V, $N_2 = 2N_1$, $R_L = 20\ \Omega$ and the transistors have $\beta = 20$. The input is a sinusoid for the maximum output signal at $V_m = V_{CC}$. Determine
    a) output signal power
    b) collector dissipation in each transistor.

19. Draw the circuit diagram of a Class-A power amplifier and explain its working. Derive expression for efficiency.