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B.Tech I Year (RR) Supplementary Examinations, December 2010 ELECTRONIC DEVICES & CIRCUITS

(Common to Electrical & Electronics Engineering, Electronics & Communication Engineering, Computer Science & Engineering, Electronics & Instrumentation Engineering, Biomedical Engineering, Information Technology, Electronics & Control Engineering, Electronics & Computer Engineering, Computer Science & Systems Engineering, Instrumentation & Control Engineering) Time: 3 hours Max Marks: 80

Answer any FIVE questions All questions carry equal marks * * * * *

- 1. (a) Derive the expression for trajectory of an electron placed in combined electric(E) and magnetic fields(B). Both the fields are perpendicular to each other and the initial velocity is zero
 - (b) The magnetic flux density $B = 0.02wb/m^2$ and electric field strength $E = 10^5 v/m$ are uniform fields, perpendicular to each other. A pure source of an electron is placed in a field. Determine the minimum distance from the source at which an electron with 0v will again have 0v in its trajectory under the influence of combined Electric and magnetic fields.
- 2. (a) Define law of junction? Explain about the term cut-in voltage associated with p-n junction diode? How do you obtain cut in voltage from forward V-I characteristics?
 - (b) Briefly discuss about Avalaunche break down and Zenar break down/?
- 3. (a) Describe the action of a full wave bridge rectifier with the aid of input-output waver forms.
 - (b) What are the advantages of bridge rectifier over centre tapped Transformer?
 - (c) In a Bridge rectifier, the transformer is connected to 220 V, 60 Hz mains and the turns ratio of the step down transformer is 11:1. Assuming the diode is ideal, find
 - i. I_{dc}
 - ii. Voltage across the load
 - iii. PIV
- 4. (a) What are the different configurations of BJT?
 - (b) Derive the relation between α and β . Every student's vision
 - (c) Calculate the collector current and emitter current for a transistor with $\alpha_{dc} = 0.99$ and $I_{CBO} = 50 \ \mu$ A when the base current is 20μ A.

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- 5. (a) What is meant by triggering of UJT.
 - (b) Define intrinsic stand off ratio of UJT.
 - (c) Explain the input characteristics of UJT for $V_{BB} = 0$.
 - (d) In a UJT circuit the value of base current is 2mA, $V_{BB} = 15^V$ and $r_{b1}=6K\Omega$. Find the value of η .
- 6. (a) Draw the circuit diagram of a self bias circuit and derive expression for S. Why it is widely used.
 - (b) How to obtain quiescent point graphically for a given transistor amplifier of CE configuration explain.
- 7. (a) Discuss the step-by-step procedure for identifying feedback topology.
 - (b) An amplifier with open loop voltage gain of 1000 delivers low of power output at 10% second harmonic distortion when input is 10 mv. If 40 db negative feedback is applied and out put power is to remain at 10 w, determine required input signal and second harmonic distortion with feedback.
- 8. (a) What is the basis on which the classification may be done for oscillators.
 - (b) What are the requirements on which the oscillator depends upon.
 - (c) Why RC phase shift oscillators are needed?
 - (d) Calculate the operating frequency of BJT phase shift oscillator for R = 6K ohms, C =1500pf and $R_c = 18 \mathrm{k}\Omega$.
