*Seat No.: _____* *Enrolment No._____*

# GUJARAT TECHNOLOGICAL UNIVERSITY

**P.D.D.C. Sem- I Remedial Examination March / April 2010**

**Subject code: X11101** **Subject Name: Basic Electronics**

**Date: 06 / 04 / 2010** **Time: 12.00 noon – 02.30 pm**

**Total Marks: 70**

## Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Draw and explain the input and output characteristics of a CE transistor amplifier. | **07** |
| | **(b)** | State and prove Miller's theorem and its dual. | **07** |
| **Q.2** | **(a)** | Prove that the transition capacitance for a step graded Junction diode is $C_T = EA/W$. | **07** |
| | **(b)** | Explain the following: (1) Hall effect (2) Reach-through In BJT. | **07** |
| | | **OR** | |
| | **(b)** | Determine $\upsilon_o$ for the network shown in **Figure 1** and **Figure 2.** | **07** |
| **Q.3** | **(a)** | Explain fixed bias and self bias in a transistor. | **07** |
| | **(b)** | For the CE transistor amplifier, calculate various gains and input and output impedances for $R_L$=10 K and $R_S$= 1 K with h parameters given below. hie = 1100 Ω, hre =2.5 × $10^{-4}$, hfe = 50, hoe = 24 μA/V, 1/hoe= 40 K. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Explain compensation techniques related with transistor biasing. | **07** |
| | **(b)** | Compare CB, CE and CC transistor configurations for $A_I$, $A_V$, Ri and Ro. | **07** |
| **Q.4** | **(a)** | Draw the basic structure of an N channel FET and explain FET operation. | **07** |
| | **(b)** | Discuss transistor amplifier in a push-pull configuration. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Discuss source self bias with respect to FET and FET as VVR. | **07** |
| | **(b)** | Define conversion efficiency. | **02** |
| | **(c)** | Explain crossover distortion and how to minimize it. | **05** |
| **Q.5** | **(a)** | Explain the tunneling phenomenon and the V-I characteristics of a tunnel diode. | **07** |
| | **(b)** | A silicon transistor with $V_{BEsat}$ = 0.8 V, $h_{FE}$=100 and $V_{CEsat}$ = 0.2 V is used in the circuit shown in **Figure 3.** Find the minimum value of Rc for which the transistor remains in saturation. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | For the emitter bias network shown in **Figure 4** determine the following $I_B$, $I_C$, $V_{CE}$,$V_C$,$V_E$,$V_B$ and $V_{BC}$, given β = 50. | **07** |
| | **(b)** | Explain transistor as an amplifier. | **07** |

Figure 1.

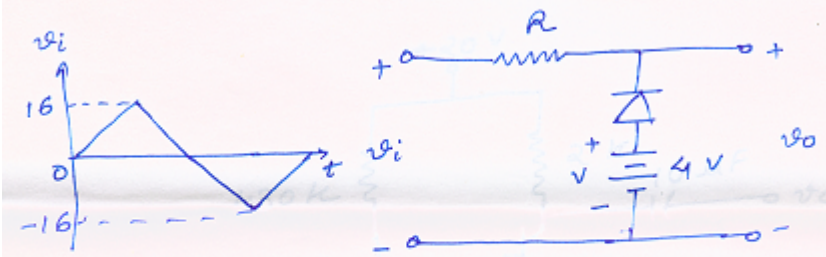



Figure 2.

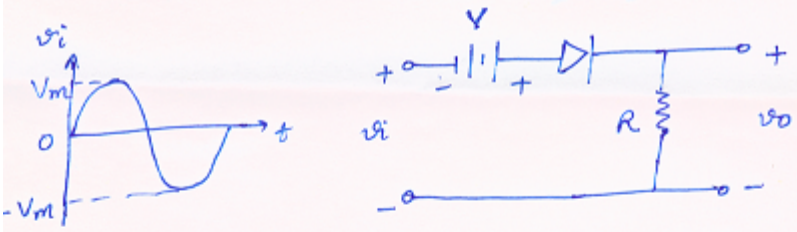



Figure 3.

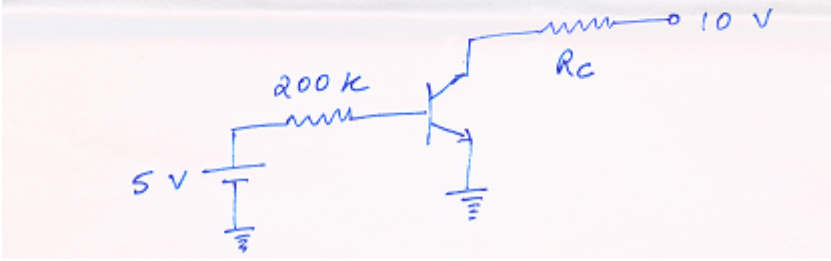
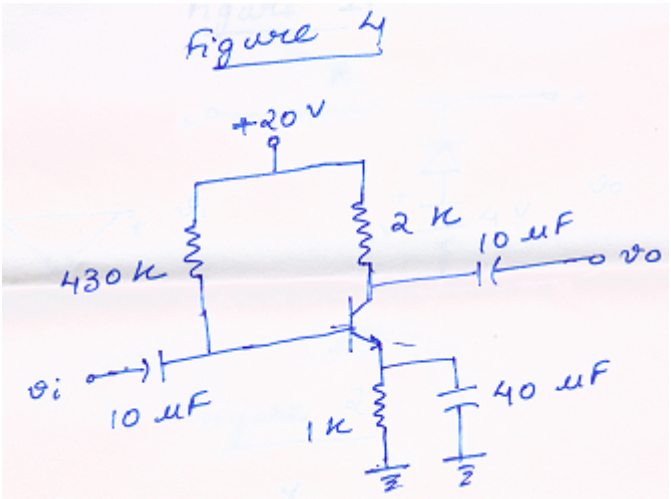



Figure 4

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