Code No.210551 **OR**

I-B.Tech I-Semester Supplementary Examinations May/June 2004
ELECTRONICS DEVICES AND CIRCUITS
(Computer Science and Engineering)

Time: 3 hours **Max. Marks: 70**

Answer any FIVE questions
All questions carry equal marks

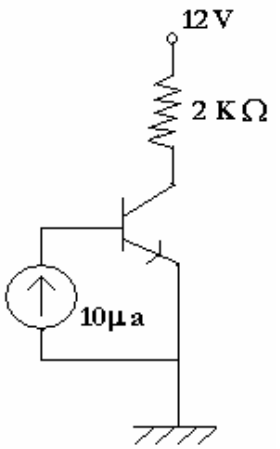
1.a) Explain the construction, operation and applications of the varactor diode.

b) In a p-type semiconductor, the Fermi level lies 0.4 ev above the valance band. Determine the new position of the Fermi level if the concentration of acceptor atoms is multiplied by a factor of (i) 0.5 and (ii) 4.0. KT = 0.025ev.

2.a) Determine the resistivity of germanium (a) in intrinisic condition at 300°K (b) with donor impurity of 1 in 10^7 (c) with acceptor impurity of 1 in 10^8 (d) with both the above impurities simultaneously. Give for germanium at room temperature.
η_i = 2.5 x 10^{13}/ cm^3 ; μ_p = 1800 cm^2/v-s, μ_n = 3800 cm^2/v-s and no of germanium atoms/cm^3 = 4.4 x 10^{22} .

b) Explain " Avalanche and zener breakdown.

3.a) A silicon transistor with V_{BE} = 0.7V, α = 0.98 and collector cut-off current of 10 μa is connected as shown. Find (i) β *and* I_{CO} (ii) I_C , I_E and V_{CE}



b) Briefly describe some applications of JFET.

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4.a) Compare electrostatic and magnetostatic deflection. Why is magnetic deflection preferred to electrostatic deflection in CRT used in TV?

b) In a CRT having electric deflection system, the deflection plates are 2cm. long and having a uniform spacing of 4mm between them. The fluorescent screen is 25cm away from the centre of the deflection plates. Calculate (i) deflection sensitivity (ii) velocity of electron on reaching the field (ii) deflection produced on the screen.

5.a) Consider the filter shown. Determine (i) the filter transfer function V_2/V_1 and therefrom the output voltage for an input voltage of

$$v(t) = \frac{200\sqrt{2}}{\pi}\left[1-\frac{4}{3}\cos 62\delta t\right]$$

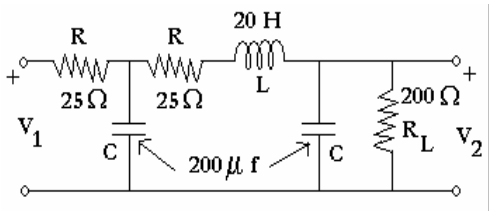

fig.

Wherein harmonics higher than second are ignored.

(ii) ripple factor R= 25Ω, R_L = 200 Ω, C = 200 μf , L = 20 H.

b) Can the value of stability factor be less than unity ? Explain .

6.a) Discuss the effect of coupling capacitor on low frequency response.

b) For the amplifier shown compute input and output impedances and individual and over all voltage and current gains using approximate analysis.

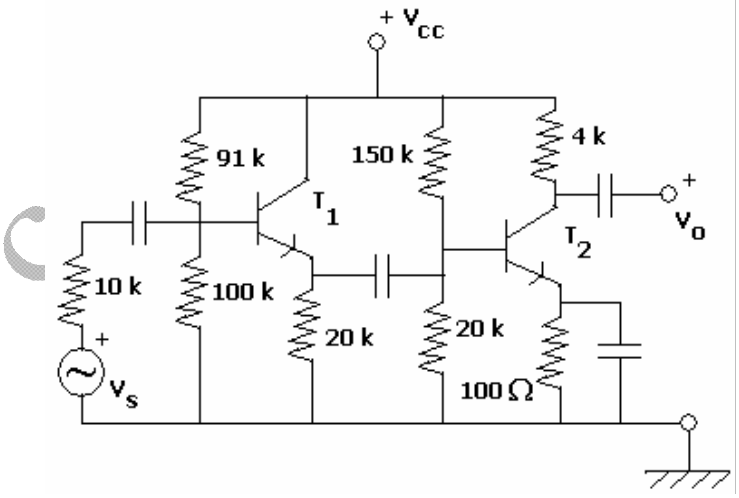

Fig.

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7.a) Define the condition for thermal stability.
b) Draw a neat diagram of a CRT and explain.

8. Write short notes on
(a) Photo Transistor (b) Monolithic Ic (c) Depletion MOSFET