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B.E. III Semester Examination

BE(LE) - III/02 (A)

25016

COMP. ENGG.

Course No. ECE - 311

(Analog Electronics - I)

Time Allowed- 3 Hours

Maximum Marks-100

Note:- Attempt any **five** questions in all by selecting atleast **one** question from each unit. All questions carry **equal** marks.

UNIT - I

1. a) Discuss Mass action law and find carrier concentration in Extrinsic semiconductor. **(10)**
- b) Find the concentration of holes and electrons in a p-type silicon at 300°K assuming resistivity as 0.02 Ω - cm. **(10)**
2. a) Explain in detail Photo diode and LED with their symbol, operation and Characteristics. **(10)**
- b) Discuss PN diode as rectifier in forward and reverse bias with characteristics and current equation in forward and reverse mode. **(10)**

UNIT - II

3. a) Explain the working of transistor in C.E configuration with characteristics. Derive the equation for collector current. (10)
- b) For a circuit $V_{cc} = 20V$, $R_c = 2K\Omega$, $\beta = 50$, $V_{be_{(active)}} = 0.2V$, $R_1 = 100K\Omega$, $R_2 = 5K\Omega$, $R_e = 100\Omega$. Calculate I_e , V_{ce} , I_b and S . Draw the circuit diagram. (10)
4. a) Discuss depletion type MOSFET with neat diagram, symbol and characteristics. (10)
- b) Explain in detail the working of UJT. Derive an expression for frequency. (10)

UNIT -III

5. a) Discuss various types of amplifiers used in electronics circuits. (10)
- b) Compare LC,RC,DC and transformer coupled amplifier. (10)
6. a) A FET amplifier shown in fig 1. has following parameters.
 $I_{dss} = 2mA$, $V_p = -2.4V$, Determine
- i) V_{gs}
- ii) Q-point. (10)

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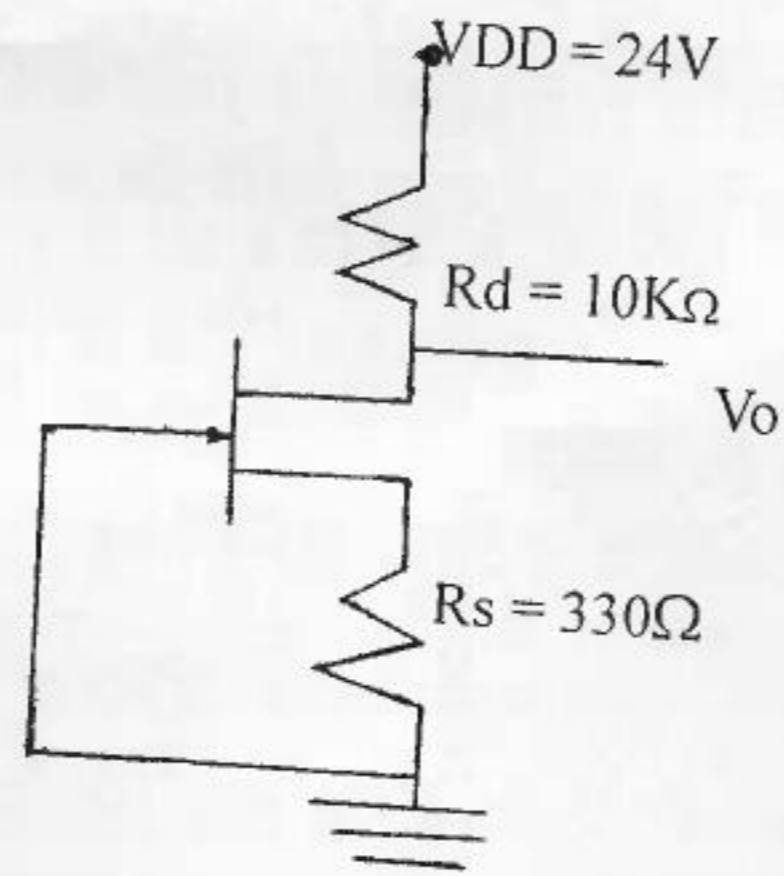


Fig. 1

- b) Find the values of R_b and S in case of the circuit shown in fig.2 (10)

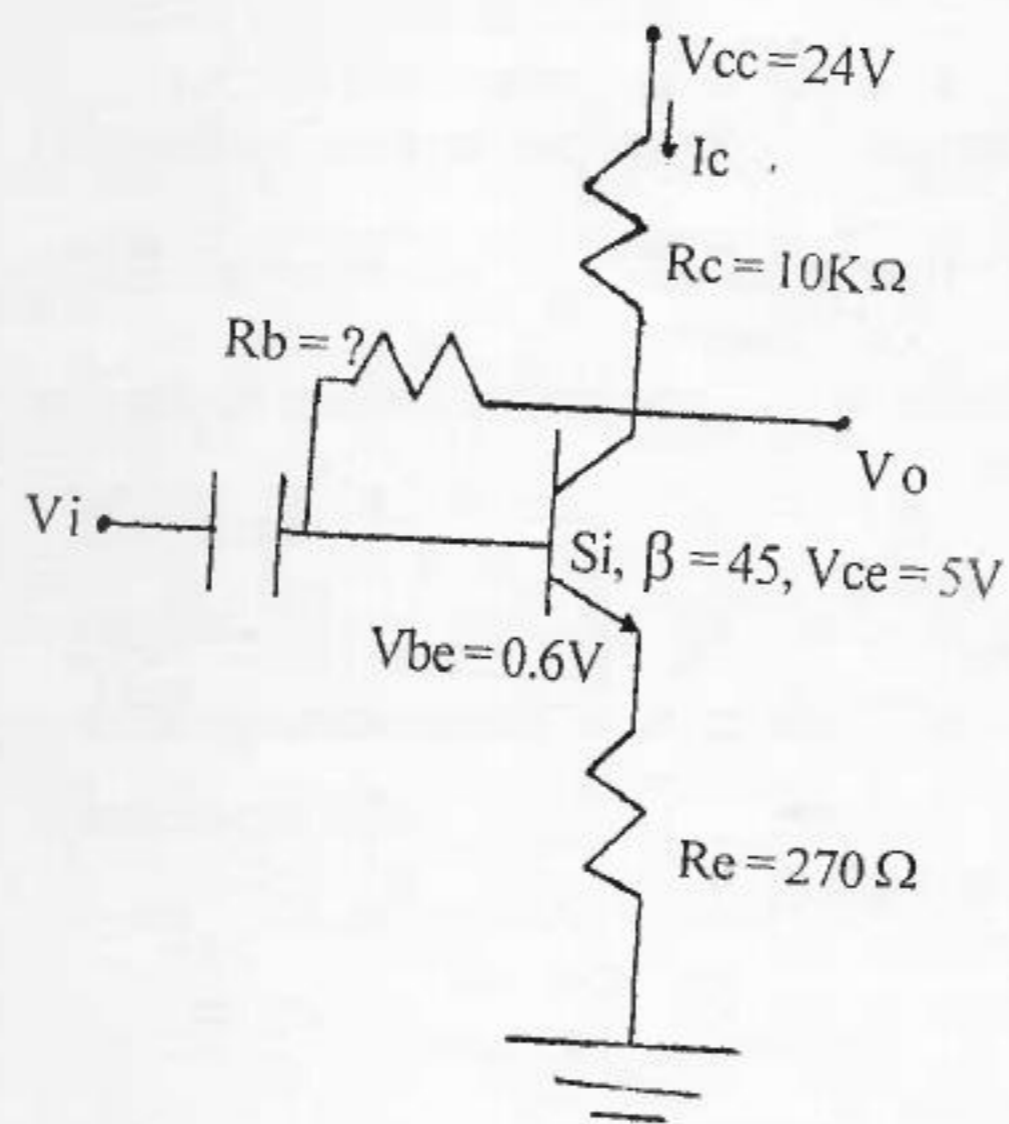


Fig.2

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UNIT - IV

7. a) Derive the Gain Bandwidth product for current. (10)
b) Find the current gain with source resistance. (10)
8. a) A BJT has following parameters measured at $I_C = 1\text{mA}$,
 $h_{ie} = 3\text{K}\Omega$, $h_{fe} = 100$, $f_T = 4\text{MHz}$, $C_c = 2\text{pF}$, $C_e = 18\text{pF}$. Find $r_{b'e}$, $r_{bb'}$, g_m and f_H for $R_L = 1\text{K}\Omega$ (10)
b) Define f_α , f_β and f_T and state the relation between f_β and f_T . (5)
c) Prove that $h_{ie} = r_{bb'} + r_{b'e}$ (5)

