Seat
No.

[5459]-133

S.E. (E&TC)/(Electronics) (First Semester) EXAMINATION, 2018
ELECTRONIC DEVICES AND CIRCUITS
(2012 PATTERN)

Time : 2 Hours　　　　　　　　　　**Maximum Marks : 50**

N.B. :— (i)　Attempt Q. **1** or Q. **2**, Q. **3** or Q. **4**, Q. **5** or Q. **6**, Q. **7** or Q. **8**.

(ii)　Neat diagram must be drawn wherever required.

(iii)　Figures to the right indicate full marks.

(iv)　Use of scientific calculator is allowed.

(v)　Assume suitable data, if necessary.

1.　(a)　What is thermal runaway ? Explain, how can thermal runaway be prevented.　[6]

(b)　Determine I_B, I_C and V_{CE} for the circuit shown in Fig.(1) :　[6]
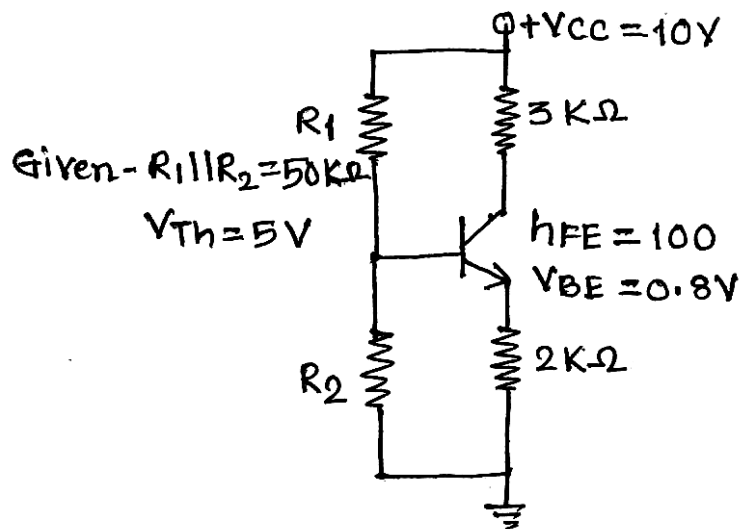
Fig. (1)

P.T.O.

Or

2. (*a*) Differentiate among C.E, C.B. and C.C. BJT amplifier configurations. [6]

(*b*) For the circuit as shown in Fig. (2), determine voltage gain, input impedance and output impedance. Assume h_{re} = h_{oe} = 0, R_{B1} = 10 kΩ, R_{B2} = 2 kΩ, R_C = 1 kΩ and R_E = 0.2 kΩ, V_{CC} = 15V, h_{fe} = 100 and h_{ie} = 1.1 kΩ : [6]
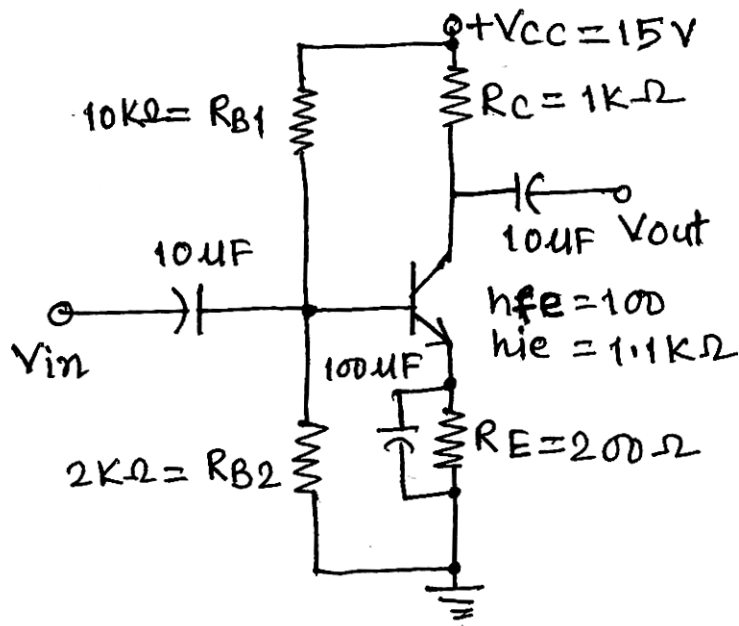

Fig. 2

3. (*a*) Draw and explain frequency response of RC-Coupled CE amplifier. [6]

(*b*) Draw and explain Hartley oscillator. [6]

4. (*a*) Compare the effect of negative feedback on input impedance, output impedance and bandwidth with voltage series and current series feedback. [6]

(*b*) Draw filter equivalent circuit to explain high frequency and low frequency response of RC-coupled CE amplifier. [6]

5. (*a*) For a transformer coupled class-A amplifier O/P voltage of 2.2 V (*p* – *p*) is obtained for an input of 100 mV (*p* – *p*) with a Load of 15Ω. The transistor is biased with V_{CC} = 10V to allow 10 mA d.c. current. Then, determine Pin dc, Pout ac and efficiency. [7]

(*b*) Differentiate among Class-A, Class-B and Class-C amplifier based on any *two* points of differentiation. [6]

Or

6. (*a*) Draw single power supply class-AB complimentary symmetry amplifier. Explain the use of diodes in the circuit. Also explain crossover distortion. [7]

(*b*) Explain harmonic distortions and total harmonic distortion and their importance in an amplifier. [6]

7. (*a*) Draw drain and transfer characteristics of E-MOSFET. Explain why E-MOSFET is called as enhancement type MOSFET. [5]

(*b*) What are the various non-ideal characteristics exhibited by E-MOSFETs ? Explain any *two* of them in detail. [8]

8. (*a*) Explain the advantages of Bi-CMOS/Bi-MOS technology. Draw suitable diagram to explain Bi-CMOS/Bi-MOS. [7]

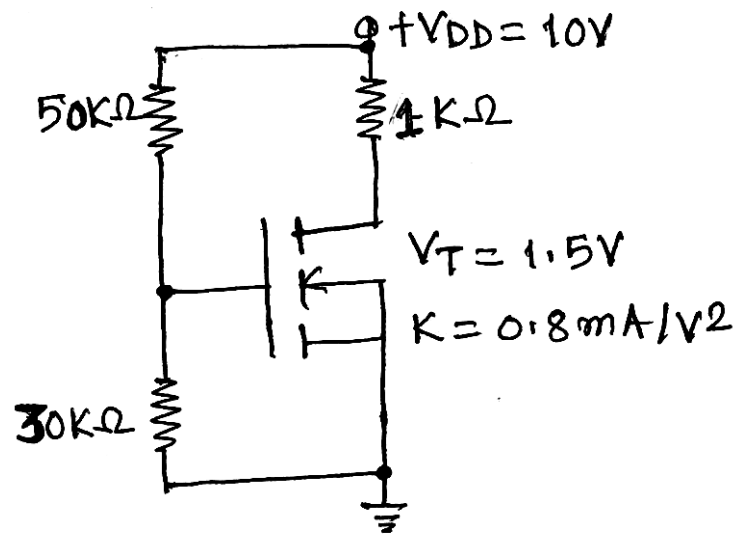(*b*) For the given circuit, determine dc operating parameters. Given : V_{Th} = 1.5V, K = 0.8 mA/V^2. [6]

Fig. 3