Total No. of Questions—**12**] [Total No. of Printed Pages—**4**

[3762]-602

S.E. (Computer Engg.) (I Sem.) EXAMINATION, 2010

ELECTRONIC DEVICES AND CIRCUITS

(2003 COURSE)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer Question **1** or **2**, **3** *or* **4** and **5** *or* **6** from Section I and Question **7** *or* **8**, **9** *or* **10** and **11** *or* **12** from Section II.

(*ii*) Answers to the two Sections should be written in separate answer-books.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data, if necessary.

SECTION I

1. (*a*) Define thermal resistance θ. State its unit. Derive equation of thermal stability in terms of thermal resistance. [8]

(*b*) A voltage divider CE amplifier circuit as shown in Fig. 1, has $\beta = 50$, $V_{BE} = 0.7$ V. Find I_B, I_C, V_{CEQ} and S. [10]

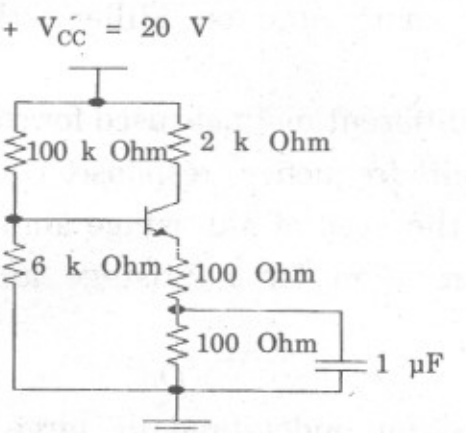

Fig. 1

P.T.O.

Or

2. (*a*) Compare fixed bias, collector to base bias and self bias circuits with respect to : [8]

(*i*) Circuit diagram

(*ii*) Biasing resistances and its location

(*iii*) Negative feedback

(*iv*) Equation for stability factors.

(*b*) Draw neat circuit diagram of a collector to base bias circuit and derive equations for I_C and V_{CE}. Explain with diagram, how temperature stability is insured in the above circuit. Also define s' and s". [10]

3. (*a*) Draw Approximate *h*-parameter model for common emitter transistor circuit with Re. Also derive expression for R_i, R_o, A_v, A_{is} and A_i. [10]

(*b*) Write a short note on Bootstrapped emitter follower circuit. [6]

Or

4. (*a*) Draw approximate *h*-parameter model for common emitter transistor circuit without Re. Also derive expression for R_i, R_o, A_v, A_{vs} and A_i. [10]

(*b*) Write a short note on Miller's theorem. [6]

5. (*a*) Explain different methods used for coupling multistage amplifiers with their frequency response. [8]

(*b*) What is the need of multistage amplifier ? Explain the selection of configuration for multistage amplifier. [8]

Or

6. (*a*) What do you understand by large signal amplifier ? Classify them on the basis of Q point position and compare them. [8]

(*b*) In three stage amplifier individual lower and upper cut-off frequency of an amplifier is 1 kHz to 100 kHz. Find bandwidth of cascaded amplifier. [8]

SECTION II

7. (*a*) What is meant by pinch-off voltage in FET ? Draw and explain drain and transfer characteristics for *n*-Channel FET. [8]

(*b*) Why FET is called voltage operated device ? Also give comparison between FET and BJT. [4]

(*c*) The *p*-channel FET has an I_{DSS} = –10 mA V_P = 5 V, V_{GS} is 5.32 V. Calculate drain current, transconductance. [4]

Or

8. (*a*) With the help of neat diagram, explain the operation of *p*-channel JFET. Also draw symbol of *n*-channel JFET, *n*-channel enhancement type MOSFET. [8]

(*b*) For the circuit shown in Fig. 2, *p*-channel JFET has V_P = 8 V, I_{DSS} = 5 mA. Calculate : [8]

(1) I_{DSQ}

(2) V_{GSQ}

(3) V_{DSQ}.

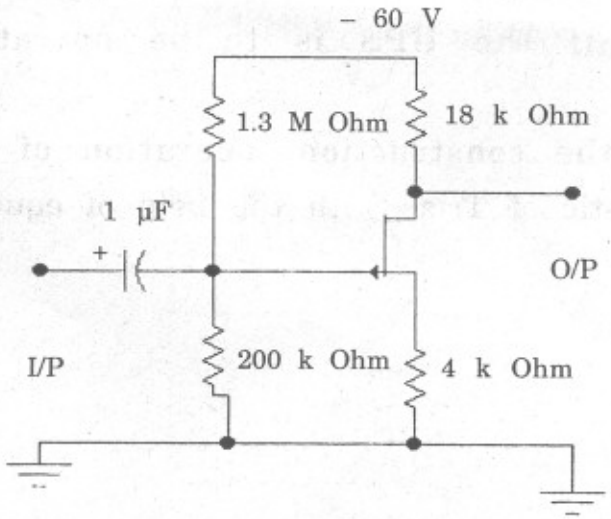

Fig. 2

9. (*a*) Draw the circuit diagram of emitter coupled differential amplifier and obtain its d.c. analysis. [8]

(*b*) What is Schmitt trigger ? What are threshold levels and hysteresis ? Explain with a neat circuit diagram. [8]

Or

10. (*a*) Draw and explain the circuit diagram of a zero crossing detector by using Op-Amp 741. Why Op-Amp can not be used in open configuration as an amplifier ? [8]

(*b*) Draw and explain integrator circuit using Op-Amp 741. Also draw input, output waveform. [8]

11. (*a*) Draw and explain two transistor model of SCR. Also explain regenerative action in SCR operation. [8]

(*b*) Compare SCR and TRIAC. Draw and explain step up (Boost) switching regulator with regulating action. [10]

Or

12. (*a*) Draw and explain on-line UPS. What operating changes are required if the UPS is to be operated as off-line UPS ? [8]

(*b*) Explain the construction, operation of Triac and V-I characteristic of Triac with the help of equivalent circuit of it. [10]