

**F.E. (Semester – II) Examination, 2011**  
**BASIC ELECTRONICS ENGINEERING**  
**(2008 Pattern)**

(For Students Admitted During the Academic Year 2008 – 2009)

Time : 3 Hours

Max. Marks : 100

- Instructions:**
- 1) Answer *any three* questions from *each* Section.
  - 2) Answers to the *two* Sections should be written in *separate* books.
  - 3) *Neat* diagrams must be drawn *wherever* necessary.
  - 4) Black figures to the *right* indicate *full* marks.
  - 5) *Use* of logarithmic tables, slide rule, Mollier charts, *electronic* pocket calculator and steam tables is *allowed*.
  - 6) Assume *suitable* data, if *necessary*.

SECTION – I

1. A) Draw and explain the V-I characteristics of Ge diode in both the modes of operation. 4
- B) A bridge rectifier is applied with input from step down transformer having turns ratio 10:1. Input applied to transformer is 230V, 50 Hz. If the diode forward resistance is  $3\Omega$ , secondary resistance is  $12\Omega$  and load resistance is  $1900\Omega$ . Calculate : 1) Ripple factor 2) % efficiency. 4
- C) Explain the working of common cathode 7-segment LED display with the status of each segment for the digits from 0 to 9. 8

OR

2. A) Draw the neat circuit diagram of zener voltage regulator and explain its working. 4
- B) Explain with circuit diagram the working of centre-tap transformer full wave rectifier with capacitor filter. Draw appropriate waveforms. 8
- C) A Si PN junction has  $I_0 = 30 \text{ nA}$  at a room temperature of  $300^\circ\text{K}$ . Calculate the junction forward voltage required to produce current of a) 0.1 mA b) 10 mA. 4

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3. A) Define  $\alpha_{dc}$  and  $\beta_{dc}$ . Derive the expression for their inter-relationship. 6
- B) Draw and explain two transistor analogy of SCR. 4
- C) A n-channel JFET has  $I_{DSS} = 8 \text{ mA}$  and  $V_P = -4 \text{ V}$ . a) If  $I_D = 4 \text{ mA}$  calculate the value of  $V_{GS}$  b) Calculate  $V_{DS(sat)}$  for  $I_D = 4 \text{ mA}$ . 6

OR

4. A) Derive the equation of DC load line for a CE amplifier circuit given in the fig. 4.1. Explain the effect of position of Q-point on the working of this amplifier. 6

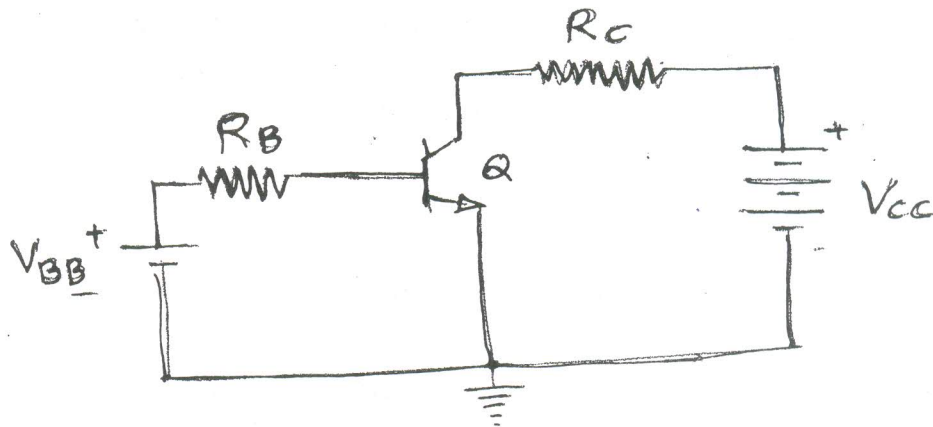


Fig. 4.1

- B) Explain the construction, working and characteristics of DIAC. 6
- C) Derive the equation  $\mu = g_m \times r_d$ . 4
5. A) Draw the circuit diagram and explain the working of an inverting summing amplifier. 7
- B) Draw the neat circuit diagram and derive the output equation of differentiator circuit. 7
- C) Give the typical values of following parameters for IC 741 : 1)  $R_i$   $\Omega$  2) Input Bias current 3) Slew rate 4) CMRR. 4

OR



6. A) Draw and explain the sine wave generator using RC phase shift oscillator.  
Give the expression for frequency of oscillations. 8
- B) Compare the positive and negative feedback. 6
- C) An op-amp is used in non-inverting mode with  $R_1 = 1 \text{ k}\Omega$ ,  $R_F = 10 \text{ k}\Omega$  and  $V_{CC} = \pm 12\text{V}$ . Calculate the output voltage for following inputs :  
a) 100 mV b) 5 V. 4

SECTION – II

7. A) Implement OR gate by using Universal NAND gate. 4
- B) What do you mean by flip-flop ? Explain the operation of clocked D flip-flop with the help of logic circuit. 6
- C) Draw and explain the full adder circuit using two half adders. 6

OR

8. A) What is multiplexer ? Explain its working with the help of block diagram. 4
- B) What is shift register ? Explain the working of any three shift registers with the help of logic diagram. 8
- C) Draw and explain the working of CMOS NAND gate with its truth table. 4
9. A) What is transducer ? Differentiate between active and passive transducer. 4
- B) Write short note on :  
1) PID controller.  
2) Alarm annunciator. 8
- C) With the help of block diagram explain working of programmable logic controller. 4

OR



10. A) Draw and explain weight measurement using LVDT. 6
- B) Draw the block diagram of instrumentation system and state the function of each block. 6
- C) Write a short note on two wire transmitter. 4
11. A) Explain the working of cellular telephone system. 6
- B) Name different types of wired links used in communication system. Give advantages of optical fiber link over other links. 6
- C) What is modulation ? Explain amplitude modulation technique in detail. 6

OR

12. A) What is superheterodyne principle ? Explain the working of superheterodyne receiver with the help of block diagram. 6
- B) Compare AM and FM. 6
- C) Write short note on RG standards for co-axial cable. 6