Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Automation & Robotics) (2011 & Onwards)   (Sem.–3)
ELECTRONICS DEVICES AND DIGITAL CIRCUITS
Subject Code : BTAR-302
M.Code : 63002

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTION TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Answer briefly :**

   a. Why is capacitive coupling used to connect a signal source to an amplifier?

   b. Determine the base current for the CE transistor circuit if $I_C = 80mA$ and $\beta = 170$.

   c. Define the transconductance of MOSFET.

   d. Give the advantages of switching regulator.

   e. Define slew rate and its significance.

   f. Draw the circuit diagram of OP-AMP as an integrator.

   g. Write the frequency equation for an astable multivibrator.

   h. Define propagation delay time.

   i. What is the difference between combinational and sequential circuits?

   j. What is the difference between Latch and a flip-flop?

SECTION-B

Q2. Explain the Operation of common drain MOSFET amplifier. Draw and explain its V-I characterstics.

Q3. Explain the working of CE amplifier. Also draw its V-I characteristics.

Q4. Draw the circuit diagram of Op-Amp as an inverting amplifier and derive the expression for output voltage.

Q5. Minimize the function given below by means of Quine-McClusky method and realize it With NAND gates.

$$f = \Sigma\,(0,1,2,7,8,9,14) + \Sigma\,\phi\,(4,6,12,15)$$

Q6. With suitable example, design a sequential circuit using JK-flip-flop.

SECTION-C

Q7. (a) Design a 4-bit ripple counter using negative edge triggered JK flip-flop.

(b) Explain the working principle of dual slope A/D converter.

Q8. Describe the 555IC. Design an astable multivibrator circuit to generate output pulses 25%, 50% duty cycle using a 555 timer IC. With choice $C = 0.01\mu F$ and frequency as 4.0 KHz.

Q9. Write short notes on **any two** :

(a) Switching regulators

(b) Schmitt trigger

(c) V–I converters

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.