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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Automation &amp; Robotics) (2012 &amp; 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) Draw a hybrid model for a linear circuit having  $V_i$ ,  $I_i$  is input voltage, current and  $V_o$ ,  $I_o$  is output voltage, current.
- b) Draw the circuit indicating the use of 78XX as an adjustable voltage regulator. Also write the expression for output voltage.
- c) An op-amp has an open-loop gain of 90,000.  $V_{sat} = +13V$ . A differential voltage of  $0.1V_{pp}$  is applied between the inputs. What is the output voltage?
- d) What is a key characteristic of an instrumentation amplifier?
- e) Define Monostable Multivibrator. Why it is called one-shot multivibrator?
- f) What is K-map?
- g) What is the advantage of D-flip-flop over an S-R flip-flop?
- h) Differentiate between Demultiplexer and Decoder.
- i) What is the maximum modulus for a counter with 4 numbers of flip-flops?
- j) Draw the circuit diagram of mono-stable multivibrator using NPN transistors.

**SECTION-B**

2. Draw the equivalent circuit of a common emitter amplifier in terms of  $h$ - and obtain the expression for voltage gain. (2.5+2.5)
3. Define and explain filter voltage Regulation and ripple voltage. (2.5+2.5)
4. Draw the schematic diagram of a peak detector using an operational amplifier and explain its working. (2+3)
5. Draw the block diagram of VCO. Explain its working in details. Also write down the expression for centre-operating frequency  $f_0$ . (1 +2+2)
6. Draw and explain the working of Master-Slave JK flip-flop. (1.5+3.5)

**SECTION-C**

7. What is a Schmitt trigger? Draw the schematic diagram of Schmitt trigger explain its working in details. How does it differ from a comparator? (2+6+2)
8. Draw and explain the working of a 555 timer connected as a mono-stable multivibrator. Derive the relation for the time interval during which the output remains high. (7+3)
9. Draw and explain the working of a circulating register or ring counter. (3+7)

**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.**