

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:130902**Date:21/12/2015****Subject Name:Analog & Digital Electronics****Time: 2:30pm to 5:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Define and Explain the following terms. Also specify their typical values for IC 741C. **07**

- (1) CMRR
- (2) Output voltage swing
- (3) Gain Bandwidth Product

(b) Why op-amps are not used in open loop configuration for linear application? Draw basic feedback configurations. What do you understand by negative feedback? Derive formula for closed loop gain of negative feedback amplifier. **07**

Q.2 (a) Discuss (i) Voltage Follower (ii) Current to Voltage Converter **07**

(b) An IC741 op-amp is connected in voltage shunt feedback configuration. $R_I = 1\text{ k}\Omega$ and $R_F = 4.7\text{ k}\Omega$. Calculate the values of A_F , R_{IF} , R_{oF} , f_F and V_{oOT} . Op-amp specifications are given as,

$$A=200000, \quad R_i=2\text{ M}\Omega, \quad R_o=75\ \Omega,$$

$$f_o=5\text{ Hz}, \quad \text{Supply voltage} = \pm 15\text{ V} \quad \text{and}$$

$$\text{output voltage swing} = \pm 13\text{ V}$$

How would the circuit behave if the feedback resistor R_F is replaced by open circuit?

OR

(b) Explain application of Op-Amp as Summing Amplifier. **07**

Q.3 (a) What is a filter? Distinguish between active and passive filters. Discuss application of Op-Amp as First Order Butterworth Low Pass Filter. **07**

(b) Discuss: Application of IC555 as monostable multivibrator. **07**

OR

Q.3 (a) Explain: Half Adder. **07**

(b) Do as directed. **07**

- (1) Convert to Binary : $(228.725)_{10}$
- (2) Subtract $62 - 118$ using 8-bit 1's complement arithmetic.
- (3) Convert the following hexadecimal number to octal
 $4B8.A7$

Q.4 (a) Obtain the minimal SOP expression for $\sum m(2,3,5,7,9,11,12,13,14,15)$ and implement it using AOI logic. **07**

(b) Show that NAND gate is a universal gate. **07**

OR

- Q.4 (a)** Reduce the following expression using K-map and implement them in universal logic. **07**
 $\sum m(0,1,4,5,6,7,9,11,15) + d(10,14)$
- (b)** What is a decoder? Explain with logic diagram, operation of a 3 to 8 line decoder. **07**
- Q.5 (a)** What is a Multiplexer? Discuss 4:1 multiplexers. **07**
- (b)** Discuss: S-R Latch. **07**
- OR**
- Q.5 (a)** Discuss the following digital IC specifications. **07**
- (1) Propagation delay
 - (2) power Dissipation
 - (3) fan-in
 - (4) fan-out
- (b)** What is Synchronous Counter? Discuss: 4-bit Synchronous Up Counter. **07**
