QP Code : 3498

(3 Hours) [Total Marks : 80

N.B. (1) Question No. 1 is compulsory.
(2) Attempt any three questions from the remaining five questions.
(3) Assume suitable data if necessary.

1. Attempt any five :—

   (a) Draw pin diagram of IC 741. Mention any four practical values of op-amp parameters. 4

   (b) What are drawbacks of basic differentiator circuit ? Suggest remedies. 4

   (c) Design high pass filter with a cut off frequency of 10 KHz and pass band of 2. Assume C = 0.1 µF 4

   (d) Draw the combinational circuit using basic gates to obtain following output. 4

   $$Y = AB + B\overline{C} + \overline{A} \cdot \overline{B}$$

   (e) Convert the following — 4
      (i) 1011011 to gray code
      (ii) $(CD8 \cdot 4)_{16}$ to octal

   (f) Explain in brief types of Registers. 4

2. (a) Design and draw astable multivibrator for output frequency of 5KHz and duty cycle of 60% using IC 555. Also draw waveforms across timing capacitor and the output. Assume Vcc = 5V. 10

   (b) Explain operation of op-amp as an adder. Draw a circuit for inverting summing amplifier with $V_1 = 2V$, $V_2 = 4V$ and $R_1 = R_2 = R_F = 10k\Omega$. Calculate output voltage. 10

3. (a) Design an adjustable voltage regulator for the range of 1·25 V to 15 V using IC 317. Also draw circuit for practical voltage regulator using IC 317. 10

   (b) Explain with waveforms positive and negative clipper circuit using opamp. 10

4. (a) Explain with diagram working and operation of successive approximation ADC. 10
   (b) Explain w.r.t. digital ICs 5
      (i) Propogation delay
      (ii) Noise margin
   (c) Write short note on interfacing between TTL and CMOS logic families. 5

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5. (a) Sinplify the following expression and implement using universal gate   10

$Y = \Sigma m (1, 4, 8, 12, 13, 15) + \Sigma d (3,14)$

(b) Implement following expression using –

(i) one 8 : 1 mux   10

(ii) two 4:1 Mux

(iii) one 4 : 1 Mux

$F (A , B, C) = \Sigma m (0, 2, 5, 6, 7)$

6. (a) Convert S-R flip flop to T-flip flop.   5

(b) Compare combinational and sequential circuits.   5

(c) Explain with timing diagram the working of four bit asynchronous up counter   10
using JK flip flop.