Q. P. Code: 50726

(3 Hours) **[Total Marks: 80]**

N.B.: (1) Question No. 1 is compulsory.
(2) Solve any three questions from the remaining five.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1		Attempt any 4 questions:	
	(A)	Draw a neat circuit of half wave precision rectifier. Draw its input and output waveforms.	[05]
	(B)	Draw a neat circuit with all the component values of mono-stable multivibrator for timer application using IC 555 to obtain a pulse width of 1.1 ms. Take timing capacitor of value 1 µf.	[05]
	(C)	Draw a neat circuit of Current to Voltage converter. Give its output expression.	[05]
	(D)	Draw the functional block diagram of IC 723.	[05]
	(E)	Draw the internal structure of IC 7490 decade counter. Draw its timing diagram.	[05]
Q.2	(A)	Draw a neat circuit diagram of *RC* phase shift oscillator using op-amp. Derive its frequency of oscillation. What are the values of *R* and *C* if its frequency of oscillation is 1 kHz?	[10]
	(B)	Draw a mod-10 counter using IC 7493. Draw its timing diagram.	[10]
Q.3	(A)	With the help of a neat diagram and voltage transfer characteristics explain the working of inverting Schmitt trigger. Derive the expressions for its threshold levels.	[10]
	(B)	Design a voltage regulator using IC 723 to give V_o = 4 V to 32 V and output current of 2 A.	[10]
Q.4	(A)	Draw the circuit diagram of a square and triangular waveform generator using op-amps and explain its working with the help of waveforms. For variation in duty cycle what is the modification needed in the circuit.	[10]
	(B)	Design a second order Butterworth high pass filter for cut off frequency of 1 kHz and pass-band gain of AF=2.	[10]
Q.5	(A)	What is an instrumentation amplifier? Draw a neat circuit of an instrumentation amplifier using 3 op-amps. Derive its output voltage equation.	[10]
	(B)	With the help of a functional block diagram explain the working of voltage regulator LM317 to give an output voltage variable from 5 V to 10 V to handle maximum load current of 500 mA.	[10]
Q.6		Write short notes on: (Attempt any two)	
	(A)	Various parameters of op-amp.	[10]
	(B)	IC 74181 Arithmetic Logic Unit.	[10]
	(C)	Power amplifier LM380.	[10]

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