

P. Pages : 2

Time : Three Hours



AV - 3296

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

- | | | | |
|----|----|--|---|
| 1. | a) | Draw the ckt. Diagram of dual I/P, balanced O/P differential Amplifier. Derive the exp ⁿ for differential mode gain A_d & common mode gain (A_C) using h-parameter. | 8 |
| | b) | Explain need of O/P offset voltage balancing. Explain how offset balancing is done in opamp IC 741. | 6 |

OR

2. a) For the dual I/P balanced O/P differential amplifier
 $R_C = 1\text{ k}\Omega$, $R_S = 1\text{ k}\Omega$, $R_E = 2.5\text{ M}\Omega$, $h_{fe} = 50$, $h_{ie} = 1\text{ k}\Omega$ the ckt. is operated with differential signal of 1 mV & common mode signal of 20 mV. Calculate O/P voltage V_o & CMRR in dB. 8
- b) Define the following parameters : 6
 - i) Slew rate
 - ii) I/P offset voltage
 - iii) I/P offset current
 - iv) CMRR
3. a) What are the important requirement of Instrumentation amplifier. Draw & explain the working of variable gain instrumentation amplifier. 7
- b) Draw DC voltage follower & explain its operation. How do you modify the circuit when it is to be used for AC application. 6

OR

- | | | | |
|----|----|---|---|
| 4. | a) | Draw and explain inverting half wave precision rectifier & derive the expression for O/P voltage. | 6 |
| | b) | Draw the ckt for differential amplifier using OPAMP & derive the expression for O/P voltage. | 7 |
| 5. | a) | Draw & explain the circuit of a voltage sweep generator with waveform by using OP-AMP. | 7 |

- b) Design a first order low pass butterworth filter having cut off frequency of 6 kHz & pass band gain of 2. 6

OR

6. a) Explain the working of Schmitt trigger circuit using OP-AMP. Derive the expression of UTP & LTP of Schmitt trigger ckt. 7
- b) Explain the operation of positive & negative clipper with the help of circuit diagram & waveforms. 6

SECTION - B

7. a) Draw the internal block diagram of IC 723 voltage regulator & explain the function of each block. 7
- b) What is principle of switched mode power supplies ? Discuss their advantages & disadvantages. 6

OR

8. a) Design a regulator using IC 723 for an output voltage $V_o = 6V$, $I_L = 1mA$, $I_{SC} = 150 mA$ & $V_{sense} = 0.7V$. 7
- b) Give a ckt configuration for a dual power supply $\pm 15V$ using three terminal voltage regulator ICs. 6
9. a) Explain the operation of IC 8038 with necessary circuit diagram. 6
- b) Design a square wave generator using IC 555 for a frequency of 150 Hz & 70% duty cycle. Assume $C = 0.1 \mu f$. 7

OR

10. a) Explain the application of IC 555 monostable as a frequency divider. Design frequency divider for dividing by 3. 7
- b) With neat ckt diagram explain sample & hold ckt. 6
11. a) Define capture range, lock range & pull in time of PLL. Why is capture range always smaller than lock range. 7
- b) Calculate the O/P frequency f_o , lock range f_l & capture range f_c of IC 565. Assume $R_1 = 10\Omega$, $C_1 = 0.01\mu f$ & $C = 20\mu f$ if supply voltage is $\pm 10V$. 7

OR

12. a) Discuss the application of PLL IC for frequency multiplication. Differentiate between frequency multiplication & frequency translation. 7
- b) Draw the ckt diagram of AM detector using PLL & explain its operation. 7
