

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) Assume **suitable** data if **necessary**.
 (4) Figures to **right** indicate **full** marks.

1. Answer any Four: 20
 - (a) State and Explain Barkhausen's criterion for Oscillators.
 - (b) Draw the circuit diagram of Dual input Balanced output Differential amplifier and write formulae for A_d , A_c , CMRR, R_{in} and R_o .
 - (c) List down the ideal characteristics of OPAMP.
 - (d) Draw the Pin Diagram of IC 555, neatly identifying name of each pin and Explain the use of pin no. 5.
 - (e) Draw the neat labeled Diagram of R-2R type DAC.
2. (a) With the help of neat labeled circuit diagram, Explain the working of Practical Integrator. Also Explain its advantages over a simple Integrator. 10
- (b) Draw and Explain the working of a Square and Triangular Wave Generator using OPAMP. 10
3. (a) Design a Wein Bridge Oscillator for a frequency of 1000 Hz. 5
- (b) Explain using an OPAMP the operation of a wein Bridge Oscillator. (No Derivation). 5
- (c) Explain the working of a Non Inverting Adder using OPAMP. 10
4. (a) Design an Astable multivibrator using IC 555 for f_o 5KHz and duty cycle of 75%. 10
- (b) Draw and Explain Successive Approximation Register type ADC. 10
5. (a) Draw and Explain the circuit diagram of First Order Butterworth Low Pass Filter. 10
- (b) Design a First Order Low Pass Filter for cut-off frequency of 1KHz and Pass band gain of 10. 10

6. (a) Explain the working of IC 723 as a Low Voltage Regulator 10
- (b) For a CE amplifier with Bypass capacitor, $R_1 = 100K\Omega$, 10
 $R_2 = 10k\Omega$, $R_c = 2.2k\Omega$, $R_E = 680\Omega$, $V_{CC} = +16V$, $V_{BE} = 0.6V$, $\beta = 200$,
 $r_e = 25\Omega$, $R_L = 50K\Omega$. Determine:
 DC bias point (V_{CEQ} and I_{CQ}),
 Current Gain (I_o/I_{in}),
 Output Resistance (R_o).
7. Write Short Notes on (Any Four) 20
- (a) Stability Factor for Biasing circuits.
- (b) Switching Regulators.
- (c) Level Shifting Circuits.
- (d) IC 555.
- (e) Three Terminal Regulators.
- (f) Advantages of Active Filters.