

Bachelor of Science (B.Sc.) Semester—III (C.B.S.) Examination

**ELECTRONICS
(OP-AMP & POWER SUPPLY)**

Paper—I

Time : Three Hours]

[Maximum Marks : 50

- N.B. :**— (1) All questions are compulsory and carry equal marks.
 (2) Draw neat diagrams wherever necessary.
 (3) Only **10** out of **12** sub-questions are to be attempted from Question No. **5**.

EITHER

1. (A) Draw the circuit of emitter coupled difference amplifier and explain its working in common and differential modes. 6
 What is the need for two power supplies in a difference amplifier ? 4

OR

- (B) Draw the block diagram of OP-Amp and explain each block. 6
 State the basic characteristics of ideal OP-Amp. 4

EITHER

2. (A) Explain the operation of OP-Amp as inverting amplifier. 6
 If the adder has $R_f = 10 \text{ k}\Omega$, $R_1 = 10 \text{ k}\Omega$, $R_2 = 2.2 \text{ k}\Omega$, $R_3 = 3.3 \text{ k}\Omega$, $V_1 = 6\text{V}$, $V_2 = -3\text{V}$, $V_3 = -0.75 \text{ V}$. What is its output voltage ? 4

OR

- (B) Explain the operation of OP-Amp as integrator. State its limitations. 5+2
 Explain OP-Amp integrator output for the following inputs :

- (i) Square wave
 (ii) Sine wave
 (iii) DC. 3

EITHER

3. (A) Give the working of Bridge wave rectifier and state its advantages. 6
 Explain the need of filter in a power supply. Give the working of capacitive filter. 4

OR

- (B) Differentiate between unregulated and regulated power supply. Explain the Zener diode as a voltage regulator and state its advantages. Explain line and load regulation. 2+5+3

EITHER

4. (A) What are the general features of I_c regulator ? Explain in brief (any five). 5
Design and explain the working of a variable power supply using LM 317 PC. 5
- OR**
- (B) Draw the block diagram of Switched Mode Power Supply and explain its working. 6
What is the concept of LDO ? Explain. State its advantages. 4
5. Answer any **TEN** :—
- (a) Draw the symbol of OP-Amp.
 - (b) State the limitations of DC amplifier.
 - (c) What is CMRR ?
 - (d) Draw the circuit diagram of voltage follower.
 - (e) State the limitation of Integrator.
 - (f) Explain how comparator will work as zero crossing detector.
 - (g) What is rectifier ?
 - (h) State the limitations of zener regulator.
 - (i) Draw the circuit for +5V power supply using I_c regulator.
 - (j) What is voltage stability factor ?
 - (k) State the principle of LDO.
 - (l) State any two applications of SMPS. 1×10