

Third Semester B. Sc. Examination  
ELECTRONICS

Paper - I

(OP Amps and Power Supply)

Time : Three Hours ]

[ Max. Marks : 50

- N. B. : (1) All questions are compulsory and carry equal marks.  
(2) Draw well labelled diagram wherever necessary.

**EITHER**

1. (A) What are the main characteristics of a direct coupled amplifier ?  
Explain the two modes of operation of a difference amplifier. What are the advantages of a difference amplifier ?  
2+6+2=10

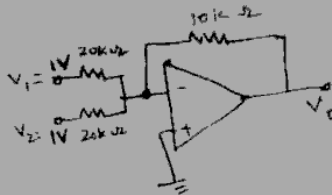
**OR**

- (B) Draw the block diagram of IC OP-AMP and explain each block.  
Derive the expressions for input impedance and output impedance of emitter coupled difference amplifier.  
5+5=10

**EITHER**

- (A) Explain the working of OP-Amp inverting amplifier.  
State its limitations.

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Calculate the output of the following circuit and identify it.

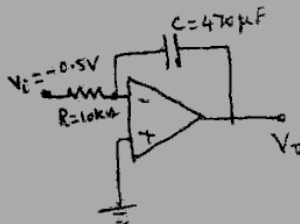


5+5=10

OR

(B) Explain the operation of OP-Amp comparator and state its limitation.

Calculate the output of the following circuit after 1.5 s. (The capacitor is fully discharged at  $t=0$ )



5+5=10

**EITHER**

3. (A) Differentiate between regulated and unregulated power supplies.

Define line and load regulation. Draw the circuit of Zener Shunt Regulator and explain its working. What are its disadvantages ?

3+2+5=10

- (B) Give the working of a Bridge Rectifier and explain its advantages over full-wave rectifier.  
Explain the need of a filter in a power supply. Give the working of a capacitive filter.  $5+2+3=10$

**EITHER**

4. (A) State the advantages of IC regulators. Explain the main features of 78xx series of regulators. Explain the design of 0-10V (regulated) variable power supply using IC 7806.

$2+4+4=10$

**OR**

- (B) Explain the basic concept of SMPS. What are its standard components? State its advantages and disadvantages. Draw the block diagram of SMPS and explain its working.

5. Answer any ten :—

- (A) Differentiate open and closed loop operation of Op-AMP.  
(B) Draw the symbol of OP-AMP.  
(C) Define Input Bias Current ( $I_b$ ) of OP-AMP.  
(D) Why is Schmitt Trigger called regenerative comparator?  
(E) Draw the output wave form of a Differentiator with square wave input.

(F) Draw the circuit of unity gain buffer amplifier using OP-AMP.

(G) Define ripple factor.

(H) What is the need of short circuit protection in a series regulator ?

(I) State the number of diodes used in Halfwave, full wave and bridge rectifier.

(J) Define Dropout voltage of a regulator.

(K) Draw the pin diagram of LM 317T.

(L) Draw the block diagram of a regulated power supply. 1x10