

NTK/KW/15 –5841

Third Semester B. Sc. Examination

ELECTRONICS

Paper - I

Op Amp and Power Supply

Time : Three Hours]

[Max. Marks : 50

- N. B. : (1) In all five questions to be attempted.
(2) Each question carries **ten** marks.
(3) Questions 1 to 4 have internal choice.
(4) Only **10** out of **12** sub questions to be attempted from question no.5

EITHER

1. (A) (a) In what respect does a difference amplifier differ from dc amplifier ? 3
(b) Explain the working of the difference amplifier in differential mode and common mode. Also explain the necessity of dual power supply. 7

OR

- (B) What is an operational amplifier ? Enlist various parameters of an operational amplifier and define any three of them. 4

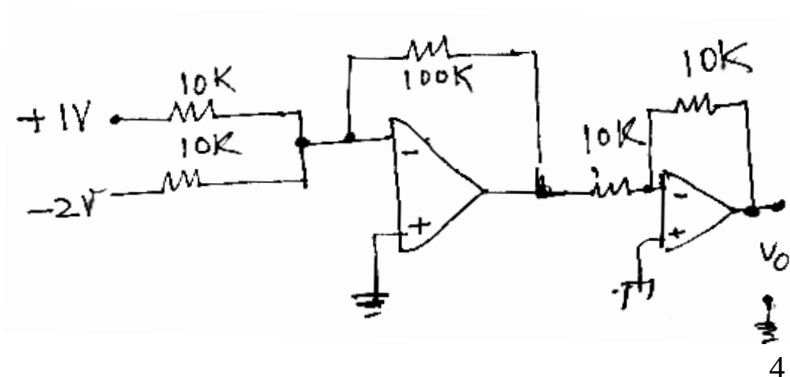
Draw the block diagram of IC OP Amp and explain the role of each block in brief. 6

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Contd.

EITHER

2. (A) (a) Obtain the expression for gain of operational amplifier in noninverting mode. 6
- (b) Find the value of output of the following circuit :



OR

- (B) (e) Explain the working of op amp as integrator. Derive the expression for its output. 6
- (d) Explain the working of op amp as Schmitt trigger. 4

EITHER

3. (A) (a) Explain the working of a bridge rectifier circuit. State its advantages over full wave rectifiers. 5
- (b) Compare the parameters of HW, FW and BR circuits. 3
- (c) Explain the role of a capacitive filter in power supplies. 2

OR

- (B) (a) Draw the block diagram of a regulated power supply. Explain its working in brief. How is it effective in overcoming the demerits of URPS ? 6
Draw the circuit of short circuit protection and explain its working. 4

EITHER

4. (A) (a) Draw the functional block diagram of IC series voltage regulator and explain the role of each subblock. 6
(b) State and explain the general features of IC regulator. 4

OR

- (B) (a) State the merits of three terminal regulator ICs. Explain how positive, negative, dual and variable power supplies are related circuit in each case. 7
(b) Draw the block diagram of a switch mode power supply. State the principle of its operation. 3

5. Answer any **ten** :—

- (a) Enlist the limitations of dc amplifiers.
(b) Explain the significance of the name virtual ground in op.Amp. Circuit.

- (c) State the ideal value of percentage regulations for a zener regulator.
- (d) Differentiate between input bias current and input offset current in different amplifier circuits.
- (e) Draw the circuit symbol and characteristics for op Amp comparator.
- (f) Draw the short circuit protection block of a regulator circuit.
- (g) State the principle of LDO.
- (h) Define CMRR, for an amplifier.
- (i) Draw the inverting buffer circuit using op Amp.
- (j) State the limitations of zener RPS.
- (k) Draw the circuit for +7V power supply using IC 7805.
- (l) What is SMPS ? 1x10=10