

16007(J) J-16

B. Tech 2nd Semester Examination

Fundamentals of Electronics Engineering (CBS)

EC-101

Time : 3 Hours

Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section E is compulsory.

SECTION - A

- (a) Describe NPN photo-transistor. Draw and discuss its V-I characteristics. (6)
- (b) Draw and explain the working of full wave centre tap rectifier. Derive the equation for ripple factor and its rectification efficiency. (6)
- (a) A specimen of silicon is 0.2 mm long and has a cross section of 0.2×0.2 mm. One volt impressed across the bar results in a current of 0.8 mA. Assuming that the current is due to electrons, calculate (a) concentration of free electrons and (b) drift velocity. (6)
- (b) Explain Zener diode as voltage regulator and derive the question of maximum power or wattage relation of Zener diode. (6)

SECTION - B

3. (a) Compare CB, CE and CC configuration. Explain which configuration is preferred in amplifiers with proper justification and equations. (6)

[P.T.O.]

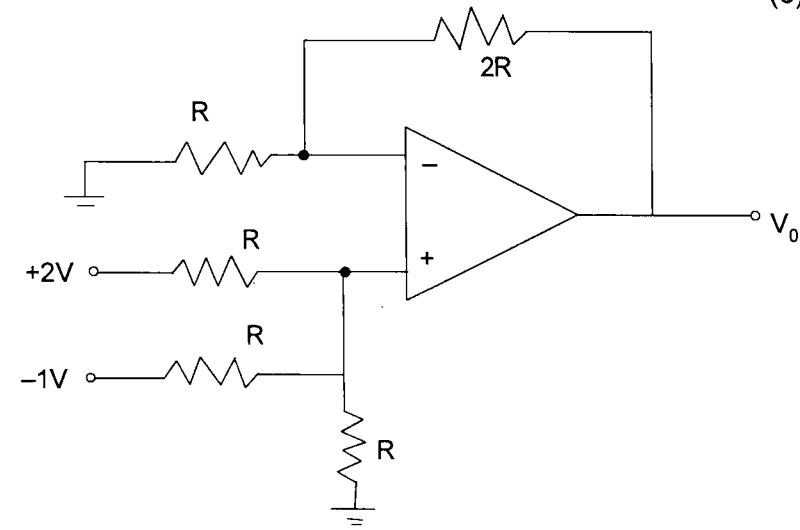
2

16007

- (b) Explain the detailed operation of N-channel depletion type MOSFET and draw its V-I characteristic and transfer characteristic. (6)
4. (a) Explain detailed operation of CE configuration and derive equations of DC load line and show it on characteristics. (6)
- (b) What are the different biasing schemes used for JFET? Explain the self-bias with necessary equations. (6)

SECTION - C

5. (a) Explain schematic block diagram of the basic op-amp. Explain the significance of virtual ground in basic inverting amplifier. How would you explain its existence? (6)
- (b) Draw the circuit diagram of RC phase shift oscillator and explain its operation by deriving expression for frequency of oscillation. (6)
6. (a) Below figure shows non inverting op-amp summer with $V_1 = 2V$ and $V_2 = -1V$. Calculate the output voltage V_0 . (6)



- (b) Explain the principle of working of Wein Bridge Oscillator. Explain why negative feedback in addition to the usual positive feedback is employed in Wein Bridge Oscillator. (6)

SECTION - D

7. (a) What is half subtractor? How it is realized using logic gates? Design a full subtractor circuit using NAND gate. (6)
- (b) Describe the block diagram of Cathode Ray Oscilloscope (CRO) and explain its working. (6)
8. (a) Show that:
- (i) $(A + B)(A' + C) = AC + A'B$
- (ii) Prove the following identity:
- $(A + B)(A' + C)(A + B') = AC$ (6)
- (b) Explain the unknown frequency and phase measure using Lissajous Pattern in CRO. (6)

SECTION - E

9. Attempt All Parts.
- (i) Show that the ripple factor of a full wave rectifier is 0.482.
- (ii) Why is open loop op-amp configuration not used in linear application?
- (iii) What do you understand by the term, "thermal instability"?
- (iv) Discuss the effect of coupling capacitor C_c on the performance of transistor amplifier.
- (v) State and prove De-Morgan's theorem.
- (vi) What is meant by CMRR and slew rate in op-amp? (2×6=12)