

Q.P. Code :23584

[Time: Three Hours]

[Marks:80]

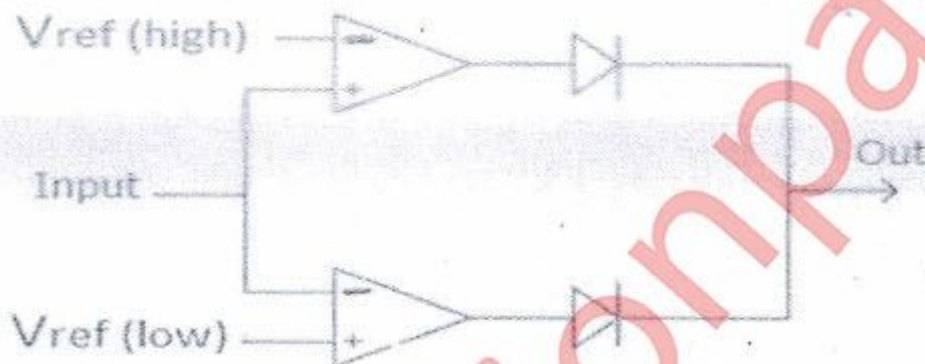
Please check whether you have got the right question paper.

- N.B:
1. Question.No.1 is compulsory.
 2. Attempt any three from remaining five questions.
 3. All question carry equal marks.
 4. Assume suitable data wherever necessary.

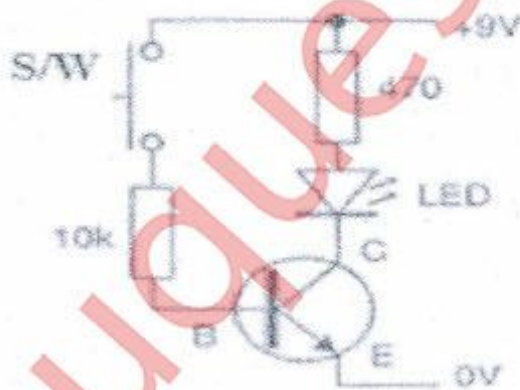
Q.1 Attempt all

20

- a) Calculate the CMRR (in dB) for the circuit measurements of $V_D = 1 \text{ mV}$, $V_0 = 120 \text{ mV}$, and $V_c = 1 \text{ mV}$, $V_0 = 20 \text{ uV}$.
- b) Explain operation of following window comparator circuit.



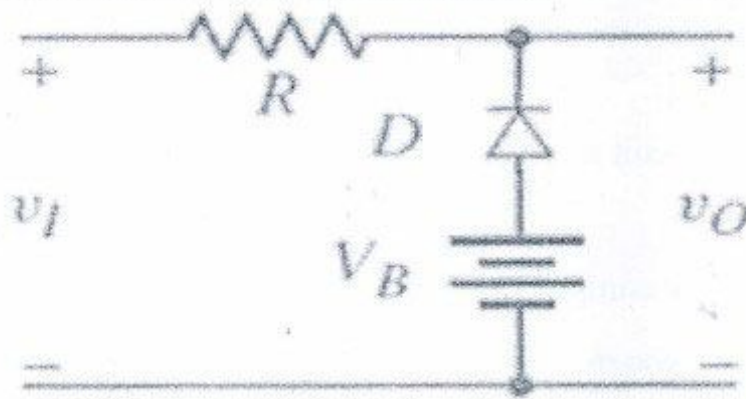
- c) Explain operation of circuit for various position of switch (S/W).



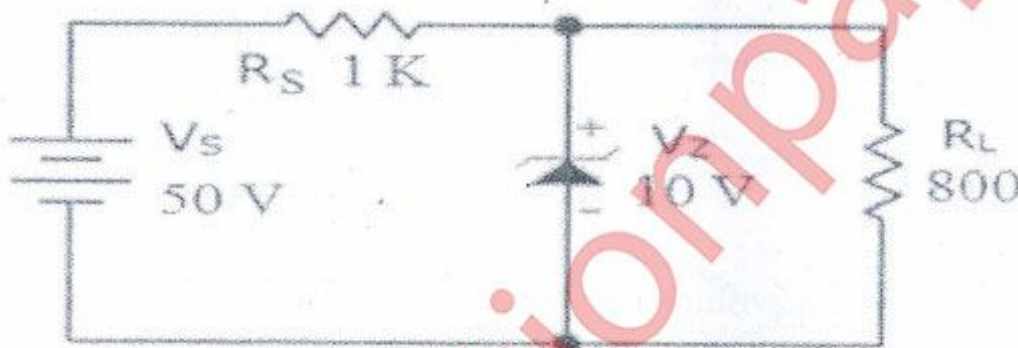
- d) Explain crossover distortion in class B power amplifier. How it is overcome.
- e) Sketch the transfer curve for an FET with $I_{DSS} = 12 \text{ mA}$ and $V_p = -6 \text{ V}$. Determine the value of I_D at $V_{GS} = -3 \text{ V}$ from the graph, and compare it to the value determined using Shockely's equation.

Q.2

- a) Determine output voltage. Assume $V_B = 8 \text{ v}$ and input to be sine wave of 20 V peak. Draw waveform considering ideal diodes. 08



- b) For the zener diode network, determine V_L , V_R , I_Z and P_Z 08



- c) Compare BJT and FET. 04

Q.3

- a) BJT transistor with emitter - stabilized bias circuit has following values, $V_{CC} = 20 \text{ V}$, $R_B = 430 \text{ K}$, $R_C = 2 \text{ K}$, $R_E = 1 \text{ k}$, $\beta = 50$. Determine operating point and V_{BC} 08

- b) Determine operating point and V_{DS} for an FET self biasing circuit with $V_{DD} = 12 \text{ V}$, $R_D = 2.2 \text{ K}$, $R_S = 1.6 \text{ K}$, $R_G = 1 \text{ M}$, $I_{DSS} = 6 \text{ mA}$ and $V_p = -6 \text{ V}$ 08

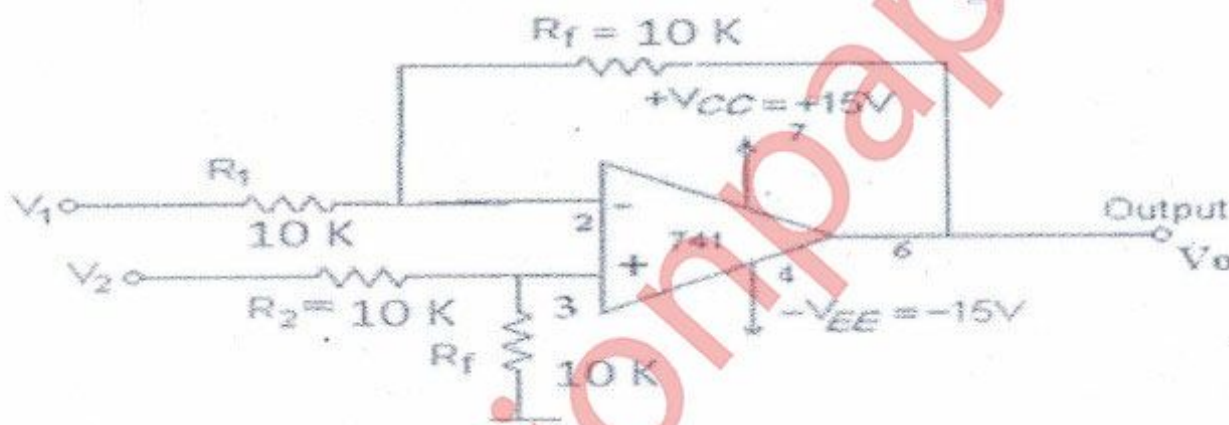
- c) Explain working of D-MOSFET 04

Q.4

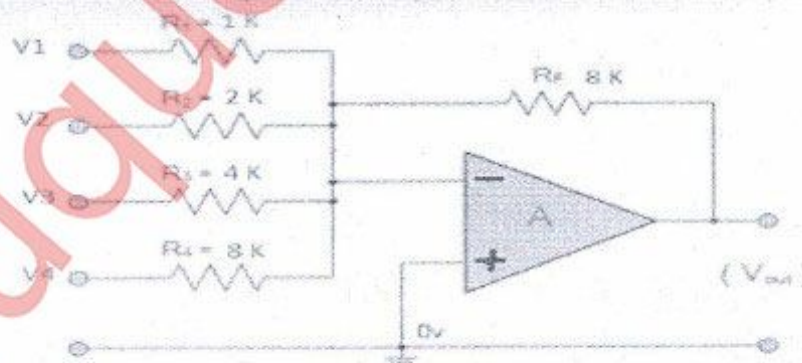
- a) Derive the expression of stability factor for a voltage divider biasing bias circuit. 08

- b) Draw and explain series voltage regulator. 08

- c) Explain total harmonic distortion. 04
- Q.5 a) Explain working of three opamp instrumentation amplifier. Derive again equation. 08
- b) Explain RC Phase shift oscillator. 08
- c) Give typical values for OpAmp IC 741. 04
- 1) gain Bandwidth Product
 - 2) Output impedance
 - 3) Slew rate
 - 4) CMRR.
- Q.6 a) Derive expression for output voltage and hence determine the output voltage consider $V_1 = V_2 = 2V$. 05

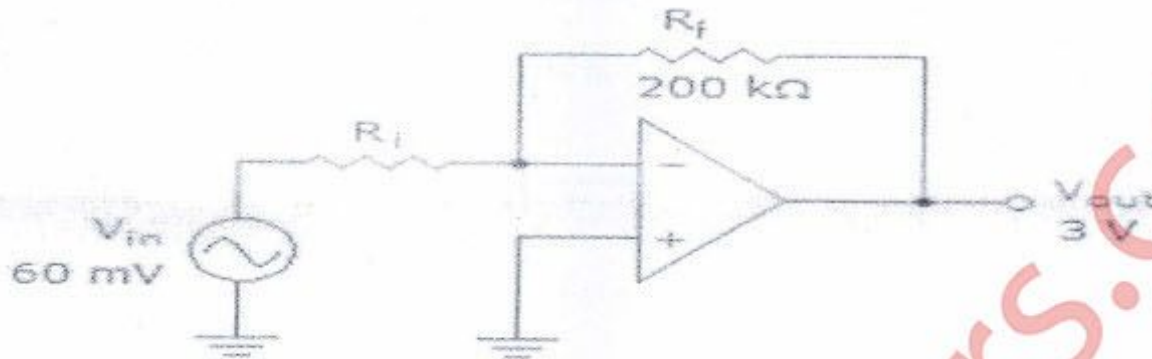


- b) Derive the expression for output voltage for the following OpAmp circuit. Determine output voltage if $R_1 = 1K, R_2 = 2K, R_3 = 4K, R_4 = 8K, R_f = 8K, V_1 = 1V, V_2 = 0V, V_3 = 1V$ and $V_4 = 1V$. 05



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- c) Identify the circuit diagram. Derive the expression for output voltage. Consider $R_f = 200K$, $V_{in} = 60mV$, $V_o = 3V$. What value of input resistance is needed in the given circuit to produce the given output voltage? 05



- d) Identify the circuit diagram. Derive the expression for output for voltage. 05

