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Course Code: EEE- 1221 Course Title: Electronics
Total marks: *50* Time: *2.5* hours

[Answer any ***two*** questions from **Group-A** and any ***three*** questions from **Group-B;** Separate answer script must be used for Group-A and Group-B.]

Group-A

1. a) What is JFET? Mention its types along with their symbol. 02
   b) Explain the working principle of n-channel JFET with proper illustration. 05
   c) A JFET has a drain current of 5 mA. If $I_{DSS} = 10$ mA and $V_{GS\,(off)} = -6$ V, find the value of (i) V_{GS} and (ii) V_P. 03

2. a) What is MOSFET? How many types of MOSFET are there? 02
   b) Using proper schematic diagram, explain the working principle of n-channel enhancement type MOSFET. 05
   c) For a certain D-MOSFET, $I_{DSS} = 10$ mA and $V_{GS\,(off)} = -8$V. 03
      (i) Is this an n-channel or a p-channel?
      (ii) Calculate I_D at $V_{GS} = -3$V.

3. a) What is multivibrator? 02
   b) Name the different types of multivibrator along with their input output relation. 02
   c) Draw the circuit diagram of Monostable multivibrator using transistors. Mention which transistor is OFF? Explain the circuit operation if we apply trigger to the base of that transistor which is OFF. 06

Group-B

4. a) What is an operational amplifier (OP-AMP)? Write down the Ideal Characteristics of an OP-AMP. 03

b) Derive an expression for the voltage gain of an inverting amplifier with proper diagram. 04

c) Determine the output voltage for the circuit of Fig. 4(c). 03

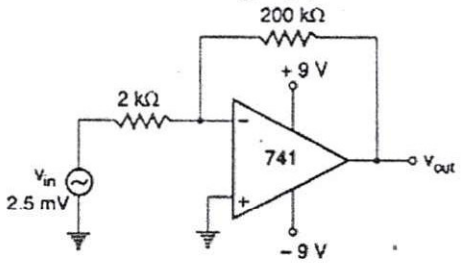

Fig.-4(c)

5. a) Draw the schematic symbol of an operational amplifier indicating the various terminals. 02

b) Show how an operational amplifier works as a Summing amplifier. 05

c) Determine the output voltage for the summing amplifier shown in Fig. 5(c) 03

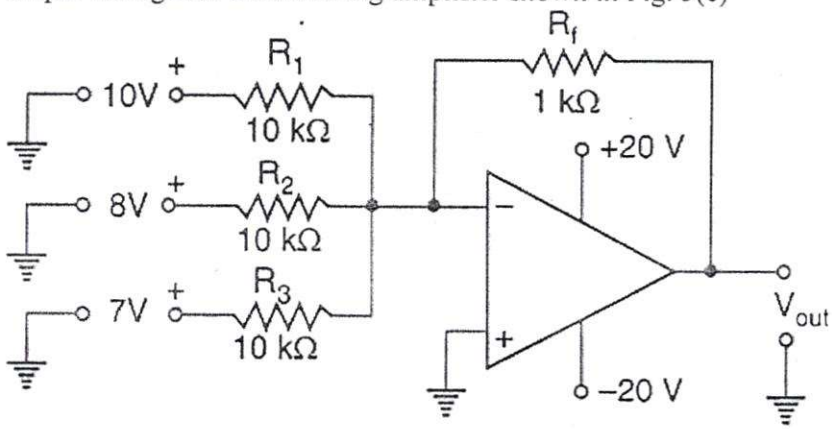

Fig.5(c)

6. a) What is Phase Lock Loop (PLL)? With simple block diagram, explain a PLL operation. What is the use of PLL? 04

b) How switching speed of BJT and MOSFET can be improved? 02

c) What is Schmitt Trigger? Write down the application of Schmitt Trigger. 02

d) What is Analog Switch? Explain its function. 02

7. a) What do you understand by feedback amplifier? 01

b) What are the differences between negative and positive feedback amplifiers? 03

c) Discuss the principles of negative voltage feedback in amplifiers with a neat diagram. 03

d) The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain reduced to 17.5. Find the fraction of output that is feed back to the input. 03