Total No. of Printed Pages: 3

F.E. Semester-II (Revised Course 2016-17)
EXAMINATION AUGUST 2020
Fundamentals of Electronics and Telecommunication Engineering

[Duration : Two Hours] **[Total Marks : 60]**

Instructions:
1) Answer THREE FULL QUESTIONS with ONE QUESTION FROM EACH PART.
2) Assume suitable data if necessary.
3) Figures to the right indicate full marks.

PART A

Answer **any One** questions from the following:

1. a) Draw a forward biased PN junction and explain the following terms: 6
      (i)   Knee Voltage
      (ii)   Potential barrier

   b) Explain the working of a half wave rectifier with the help of neat diagrams. Derive the expression for Ripple Factor.   8

   c) Determine the minimum and maximum value of Zener diode current for the circuit shown below if the Zener diode has $V_Z = 50V$.   6
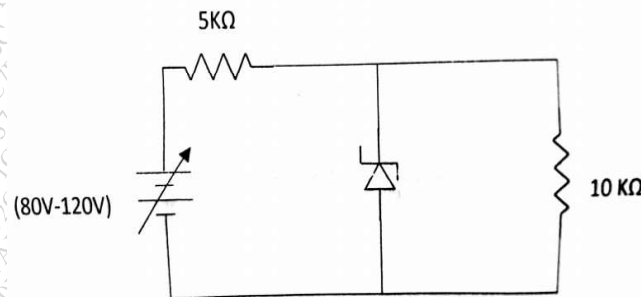
2. a) With the help of a neat diagrams explain the Input and Output Characteristics of an NPN BJT connected in Common Base configuration.   8

   b) Draw a bias circuit for a BJT with emitter resistor. Mathematically show how the operating point in the emitter stabilized bias circuit is independent of temperature.   6

   c) Determine the Q-point for the biasing circuit shown below.   6
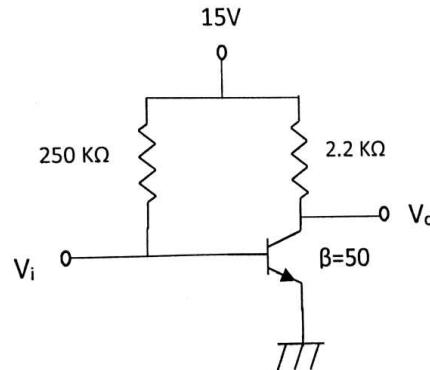
3.   a)   With the help of a neat sketch explain the construction of a Light Emitting Diode.   4

     b)   Explain the operation of a n-type depletion type MOSFET. Sketch the device drain and
          transfer characteristics.   8

     c)   Differentiate between the following: 8
          (i)   Enhancement and Depletion type MOSFETs.
          (ii)   Avalanche and Zener breakdown

PART B

Answer **any one full** questions from the following:

4.   a)   Explain the VI characteristic of an SCR.   5

     b)   What is Printed Circuit Board? Give the steps involved in the manufacture of a single sided   6
          PCB with the help of a flow diagram.

     c)   Explain the functions of transmitter and receiver blocks in an electronic communication   4
          system.

     d)   Draw the basic block diagram of a PLC and explain its principle of working.   5

5.   a)   What is an LVDT? With neat diagrams explain the internal construction and working principle   7
          of an LVDT.

     b)   Draw the block diagram of a microcontroller and list two applications. How is it different from   6
          a microprocessor?

     c)   With a neat circuit diagram and input-output waveforms explain the operation of closed-loop   7

inverting op-amp. Write the expression for the closed loop gain.

6.   a) What is a strain gauge? Define "gauge factor" of a strain gauge and write the expression for it.   6
          What is its significance?

      b) Draw the characteristics of an LDR and explain its working.   6

      c) Simplify the following expression using laws of Boolean algebra: 8
          (i) $F = A[B + \overline{C}\,(\overline{AB + A\overline{C}}\,)]$
          (ii) $F = \overline{\overline{AB} + \overline{A}} + AB$

PART C

Answer **any one full** question from the following:

7.   a) With the help of a neat diagram, show how a Common-Base transistor acts like an amplifier.   6

      b) Explain the construction of Complementary MOS with the help of a neat diagram.   6

      c) A bridge rectifier uses load resistor of 2KΩ. Each diode has internal resistance of 10Ω. Input   8
          voltage in each half cycle has amplitude of 20V and frequency of 50Hz. Calculate:
          i.   Peak, DC and RMS values of load current
          ii.   DC output voltage.
          iii.   Ripple Factor
          iv.   Rectification Efficiency
          v.   Frequency of Output.

8.   a) Draw waveforms for the modulating and modulated signals for FM, and define modulation   4
          index for the same.

      b) Draw the block diagram of a microcontroller and list two applications. How is it different from   6
          a microprocessor?

      c) Draw the logic symbol, construct the truth table & with the help of neat circuit diagram   6
          explain the working of 'OR' operator.

      d) Differentiate between an ideal and practical Op-amp.   4

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