B. E. First Semester (All) / SoE–2018-19 Examination

Course Code : EE 2101   **Course Name : Basic Electronics**

Time : 3 Hours]   [Max. Marks : 60

Instructions to Candidates :—

    (1)   All questions are compulsory.
    (2)   All questions carry marks as indicated.
    (3)   Assume suitable data wherever necessary.
    (4)   Illustrate your answers wherever necessary with the help of neat sketches.

1.   (A)   Solve any **One** :

        (A1) The equation $5x^2 - 14x - 226 = 0$ has the root 9, –6. Find the base of the system.   4(CO1)

        (A2) Perform using BCD Arithmetic :

            (i) $(457.56)_{10} + (984.56)_{10}$

            (ii) $(800.01)_{10} - (199.8)_{10}$ 4(CO1)

    (B)   Solve any **One** :

        (B1) Convert Gray code into its equivalent octal and decimal numbers $(1011010101101011)_{gray}$.   3(CO1)

        (B2) Convert octal number into its equivalent gray code $(2514)_8$.   3(CO1)

    (C)   Solve any **One** :

        (C1) Perform signed number Arithmetic using 2's complement.

            (i) $(-121)_{10} + (+98)_{10}$

            (ii) $(-89)_{10} - (-78)_{10}$ 3(CO1)

        (C2) Perform using 1's complement method.

            (i)   Subtract $(11)_2$ from $(110010)_2$

            (ii)   Subtract $(1100010)_2$ from $(101)_2$ 3(CO1)

2. (A) Solve any **One** :

(A1) Design half adder circuit with gate implementation. 3(CO1)

(A2) Design Half Subtractor Circuit impliment using logic Gates.
3(CO1)

(B) Solve any **One** :

(B1) Draw AND–OR logic circuit for the expression Y = AB + AC and replace the AND–OR circuit by NAND circuit. 4(CO1)

(B2) State DeMorgan's Theorem and use it to simplify the following expression.

$$\overline{\overline{(A+B)}+\overline{(C+D)}}$$

4(CO1)

(C) Solve any **One** :

(C1) What is D Flip Flop ? Explain with Truth Table. 3(CO1)

(C2) Explain T Flip Flop with truth table. Draw Gate level Diagram.
3(CO1)

3. (A) Solve any **One** :

(A1) Explain PN junction diode with its characteristics. 4(CO2)

(A2) What is Rectifier ? Explain center tapped Full wave Rectifier with Input Output Waveform and derive the equation for Idc, Vdc and Efficiency. 4(CO2)

(B) Solve any **One** :

(B1) A Ge diode has a reverse saturation current of 3uA. Calculate the voltage at which 1% of the rated current will flow through the diode, at room temperature if diode is rated for 1A.
3(CO2)

(B2) If the reverse saturation current in a PN junction diode is 5 nA, find the applied voltage for a forward current of 0.68uA. Assume silicon diode. 3(CO2)

(C) Solve any **One** :

(C1) Explain the working of NPN transistor. 3(CO2)

(C2) Explain working of Common emitter configuration with its input and output characteristics. 3(CO2)
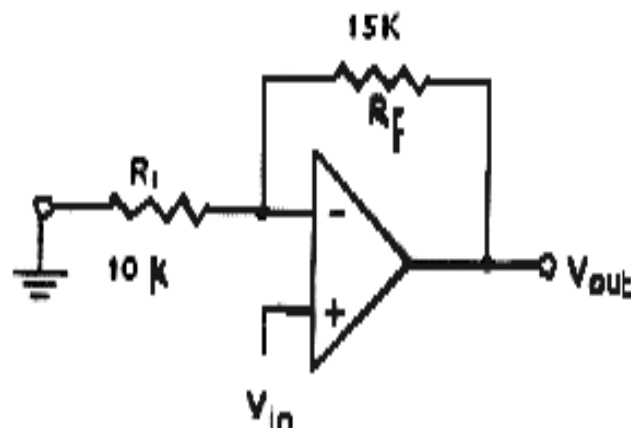
4. (A) Solve any **One** :

(A1) Draw and explain Block diagram of OP–AMP. 4(CO3)

(A2) List ideal characteristics of OP–AMP (any 8) 4(CO3)

(B) Solve any **One** :

(B1) Draw and explain summing Amplifier using OP–AMP and also derive its output equation. 3(CO3)

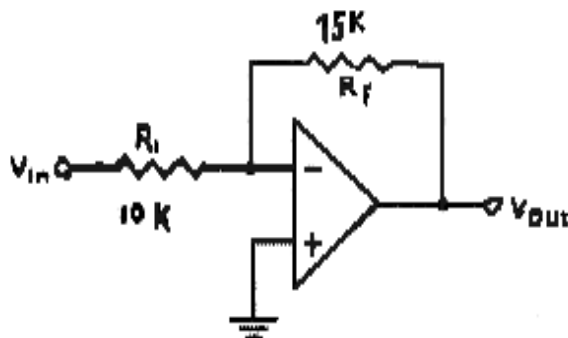(B2) What is the range of the output voltage in the circuit of fig. if the input varies from 0.1 to 0.5 V ?

3(CO3)

(C) Solve any **One** :

(C1) Draw and explain the Non–Inverting amplifier using OP–Amp and also derive its output equation. 3(CO3)

(C2) What is the range of the output voltage in the circuit of fig. if the input resistance is a potentiometer that varies from 10k to 20K and V in is 1V ?

3(CO3)

5.　(A)　Solve any **One** :

(A1) The following 8 observations were recorded when measuring a voltage :

41.7, 42.0, 41.8, 42.0, 42.1, 41.9, 42.5 and 41.8 Volts. Find

(i) The mean.

(ii) The standard deviation.

(iii) Average deviation.

(iv) Variance.　　　　　　　　　　　　4(CO4)

(A2) A circuit has turned for resonance by eight different students and the value of resonant frequency in kHz were recorded as 552, 548, 543, 535, 546, 531, 543 and 536. Calculate :

(i) Arithmetic mean.

(ii) The average deviation.

(iii) Standard deviation.

(iv) Variance.　　　　　　　　　　　　4(CO4)

(B)   Solve any **One** :

(B1) What are different standards of measurement ? Give their classification in brief.   3(CO4)

(B2) Explain various types of errors in detail.   3(CO4)

(C)   Solve any **One** :

(C1) Derive the balance condition equation for Maxwell's inductance.   3(CO4)

(C2) Describe the balance condition equation for Schering's bridge.   3(CO4)

6.   (A)   Solve any **One** :

(A1) How are transducers classified ? Give examples.   4(CO4)

(A2) Define load cell and explain its types.   4(CO4)

(B)   Solve any **One** :

(B1) Explain the working of LVDT in detail.   4(CO4)

(B2) Explain the Proximitty Sensors with neat diagram. 3(CO4)

(C)   Solve any **One** :

(C1) Explain Thermocouple in detail.   3(CO4)

(C2) Explain Thermister in detail.   3(CO4)