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) Due credit will be given to neatness and adequate dimensions.
(4) Assume suitable data wherever necessary.
(5) Diagrams and chemical equations should be given wherever necessary.
(6) Illustrate your answers wherever necessary with the help of neat sketches.

1. (A1) Perform the BCD Arithmetic :

$(679{\cdot}6)_{10} + (536{\cdot}8)_{10}$

$(123{\cdot}4)_{10} + (567{\cdot}8)_{10}$ 4 (CO 1)

(A2) Convert :

(i) $(101111011{\cdot}110)G = (?)_{10}$

(ii) $(134{\cdot}443)5 = (?)_{9}$ 3 (CO 1)

(A3) Perform using 1's complement method :

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

(ii) Subtract $(1100010)_2$ from $(101)_2$ 3 (CO 1)

OR

(B1) A and B are two successive digits in a certain number system. When written as AB it becomes [41]10 and when written as BA it becomes [49]10. Find the base of the system and values of A and B. 4 (CO 1)

(B2) Perform signed number Arithmetic using 2's complement :

(i) $(-85)_{10} + (-39)_{10}$

(ii) $(-97)_{10} - (-104)_{10}$ 3 (CO 1)

(B3) Convert octal number into its equivalent gray code :

$(1001111010)_8$ 3 (CO 1)

2. (A1) Design X – OR Gate using NAND and NOR gates only. 3 (CO 1)

(A2) Simplify the following expression using Boolean Algebra :

$A = XY + (XZ)' + XY'Z'(XY + Z)$ 3 (CO 1)

(A3) Design Half Subtractor Circuit implement using NAND Gate Only. 4 (CO 1)

OR

(B1) Design S – R Flip Flop and Explain with Truth Table. 5 (CO 1)

(B2) Design full adder circuit with gate level implementation. 3 (CO 1)

(B3) Reduce the expression using Boolean Algebra :

$F = (B + BC)\ (B + B'C)\ (B + D)$ 2 (CO 1)

3. (A1) Explain Intrinsic and Extrinsic Semiconductor with crystal structure. 3 (CO 2)

(A2) Explain Unbiased P – N junction in detail. 4 (CO 2)

(A3) For what values of reverse voltage will the reverse current reach 90% of its saturation value at room temperature ? Assume Si p – n junction diode. 3 (CO 2)

OR

(B1) What is Rectifier ? Explain center tapped Full wave Rectifier with Input Output Waveform and derive the equation for Idc, Vdc and Efficiency. 4 (CO 2)

(B2) Explain working of Common emitter configuration with its input and output characteristics. 4 (CO 2)

(B3) What is MOSFET ? Write its type. 2 (CO 2)

4. (A1) Draw and Explain Adder and Subtractor circuit using OPAMP. 5 (CO 3)

(A2) Draw and explain the Non – Inverting amplifier using OP – Amp. 3 (CO 3)

(A3) What do you mean by Slew Rate of OP – AMP ? 2 (CO 3)

OR

(B1) Explain the concept of virtual ground. 3 (CO 3)

(B2) Draw and explain differentiator using Op – amp. Also derive the expression for output voltage. 3 (CO 3)

(B3) Draw the circuit diagram using OP – AMP for given expression.
$V0 = -Rf/R1(V1 + V2 + V3)$ and derive $V0 = (1 + Rf/R1)\ (V1 + V2 + V3)$
4 (CO 3)

5. (A1) A circuit of tuned for resonance by eight different students and the value of resonant frequency in kHz were recorded as : 552, 548, 543, 535, 546, 531, 543, 536.

Calculate :

(i) Arithmetic mean.

(ii) Deviation from mean.

(iii) The average deviation.

(iv) Standard deviation. 5 (CO 4)

(A2) Describe the balance condition equation for Maxwell's bridge. 3 (CO 4)

(A3) What are different standards of measurement ? Give their classification in brief. 2 (CO 4)

OR

(B1) Define Accuracy, Reproducibility, Precision and Sensitivity with respect to measurement. 4 (CO 4)

(B2) Describe the balance condition equation for Schering's bridge. 3 (CO 4)

(B3) What are three general classes of error ? With examples discuss the means adopted to minimize error. 3 (CO 4)

6.	(A1)	Explain Thermocouple in detail.	4 (CO 4)
	(A2)	Explain the Proximity Sensors with neat diagram.	3 (CO 4)
	(A3)	Derive the expression for gauge factor of a strain gauge.	3 (CO 4)

OR

	(B1)	Explain the working of LVDT in detail.	4 (CO 4)
	(B2)	Define load cell and explain its types.	3 (CO 4)
	(B3)	Explain the bonded type strain gauges.	3 (CO 4)