Name:

Enrolment No:

UPES

End Semester Examination, May 2025

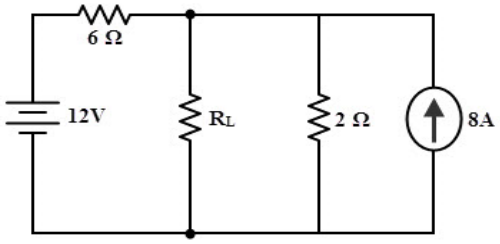
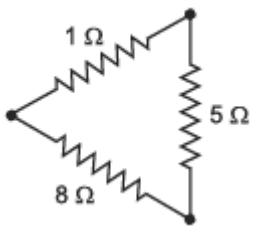
Course: Basic Electrical and Electronics Engineering **Semester: II**

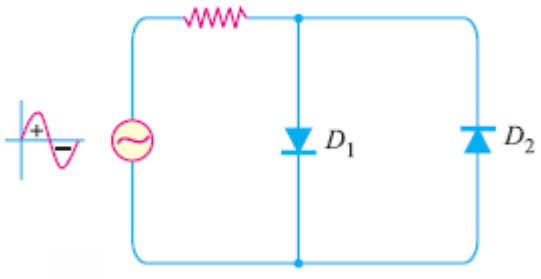
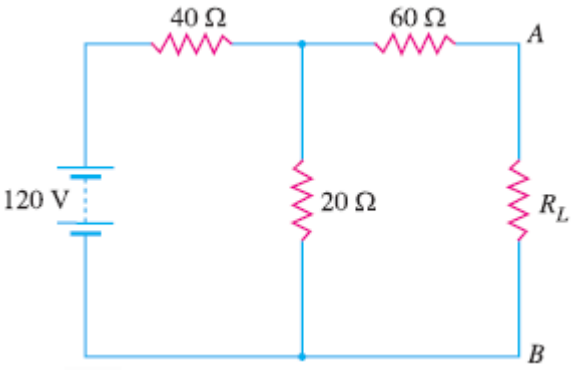
Program: B. Tech (AE, ASE, CE, ME, FSE, SE) **Time : 03 hrs.**

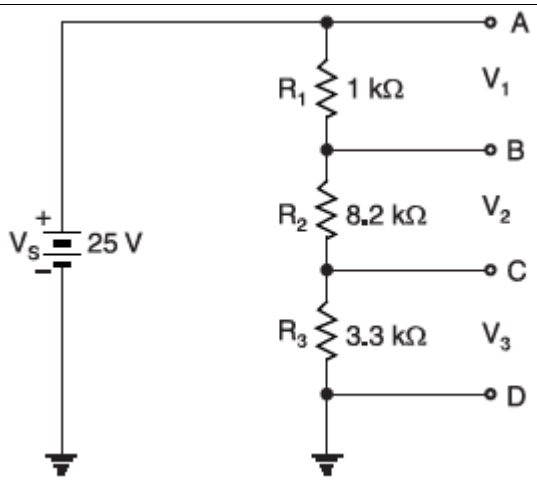
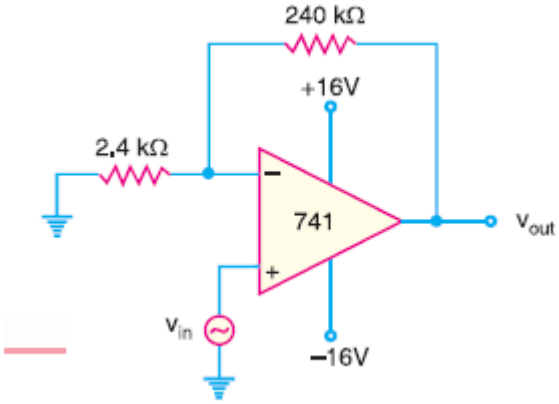
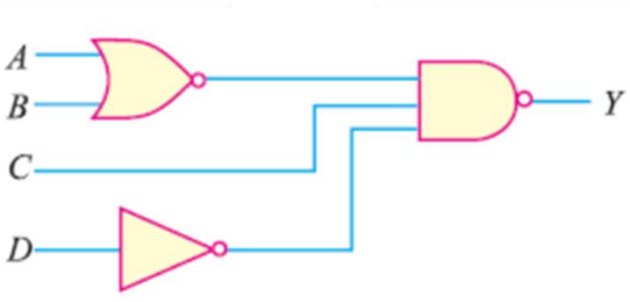
Course Code: ECEG 1013 **Max. Marks: 100**

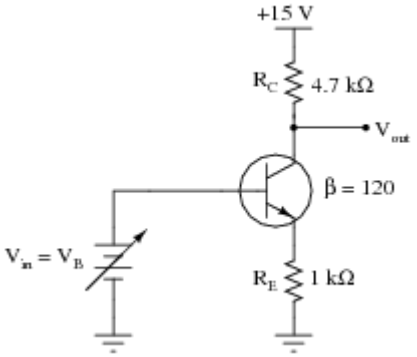
Instructions: Diagram must be neat and clear.
Answer 5 questions from Section A, 4 from Section B, and 2 from Section C.
Answer the questions in sequence

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Convert: i. $(3255)_{10} = (?)_{16}$ ii. $(AC)_{16} = (?)_{8}$ iii. $(532.2)_{8} = (?)_{10}$ iv. $(10101011)_{2} = (?)_{16}$	**4**	**CO1**
Q 2	Calculate the current through R_L. The value of R_L= 5 ohms. 	**4**	**CO1**
Q 3	A delta network is shown in Fig below. Determine its Star equivalent. 	**4**	**CO1**

Q 4	In figure below, find whether the diodes are forward or reverse biased for the given AC input. 	**4**	**CO2**
Q 5	Calculate the value of load resistance R_L to which maximum power may be transferred from the circuit shown in figure below.Also find the maximum power. 	**4**	**CO3**
SECTION B **(4Qx10M= 40 Marks)** **Answer any four question**			
Q 6	A coil having a resistance of 7 W and an inductance of 31·8 mH is connected to 230 V, 50 Hz supply. Calculate (i) the circuit current (ii) phase angle (iii) power factor (iv) power consumed and (v) voltage drop across resistor and inductor.	**10**	**CO3**
Q 7	Discuss the operation of a half wave rectifier, and find the average value, r.m.s. value, form factor and peak factor for it.	**10**	**CO2**
Q 8	Find the values of different voltages that can be obtained from 25V source with the help of voltage divider circuit of Figure below.	**10**	**CO3**

			
Q 9	(a) Describe the operation of an Operational amplifier as an non-inverting amplifier. (b) Calculate the output voltage from the noninverting amplifier circuit shown in figure below for an input of 120 μV. 	**5+5**	**CO2**
Q 10	Determine the output expression for the circuit shown in Figure below, simplify it using De-morgan's theorem. 	**10**	**CO4**

SECTION-C **(2Qx20M=40 Marks)** **Answer any two question**			
Q 11	(a) A transistor is connected in common emitter (CE) configuration with collector supply of 8 V and the voltage drop across the resistance R_C=800 ohm is 0.5 V. Assume, α=0.96 (i) Draw the proper circuit diagram, and then (ii) Determine: V_{CE} and Base current (I_B). (b) Differentiate between step-up and step-down transformers and analyze their respective applications. Obtain out the EMF equation of a transformer. A transformer with an output voltage of 4200 V is supplied at 230 V. If the secondary has 2000 turns, find the number of primary turns and turns ratio.	**10+10**	
Q 12	(a) Analyze the operation of a transistor circuit to determine how it functions as an amplifier. (b) Derive a relation between σ (current amplification factor) and β (base current amplification factor) of a transistor. (c) A CE mode NPN transistor is shown below  Determine V_E, Ic, V_Rc, Vc_E and Vc (out) for a V_B of 2 V. Assume that the transistor is a standard silicon NPN unit, with a nominal base-emitter junction forward voltage of 0.7 volts.	**20**	**CO2**
Q 13	A given expression is shown below. $Y = A\bar{B}C + \bar{A}\bar{B}C + \bar{A}BC + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C}$ (a) Draw its truth table. (b) Draw the logic circuit that implements the aforesaid expression. (c) Minimize the given expression using K Map	**20**	**CO4**