LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

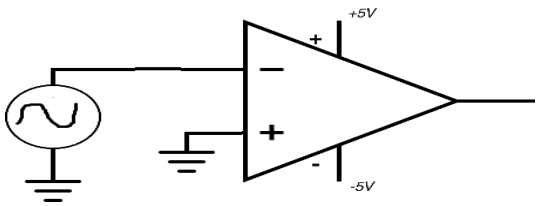
M.Sc. DEGREE EXAMINATION – **PHYSICS**

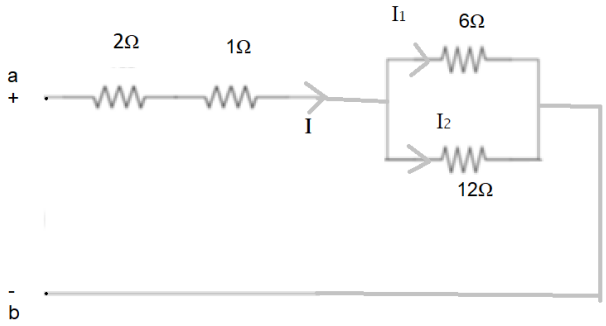
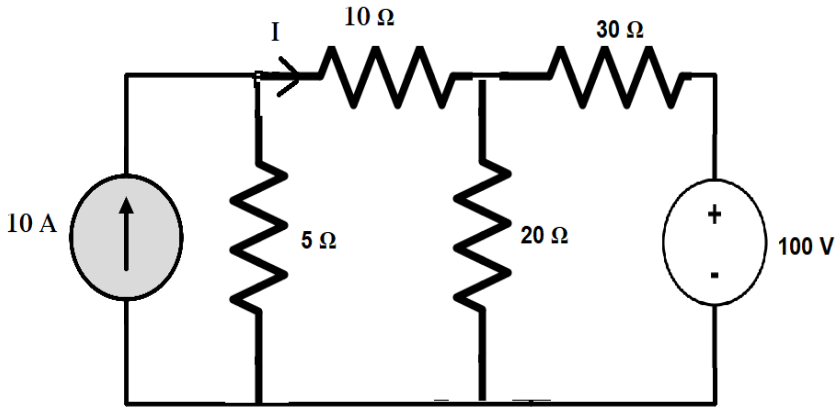
FIRST SEMESTER – **APRIL 2023**

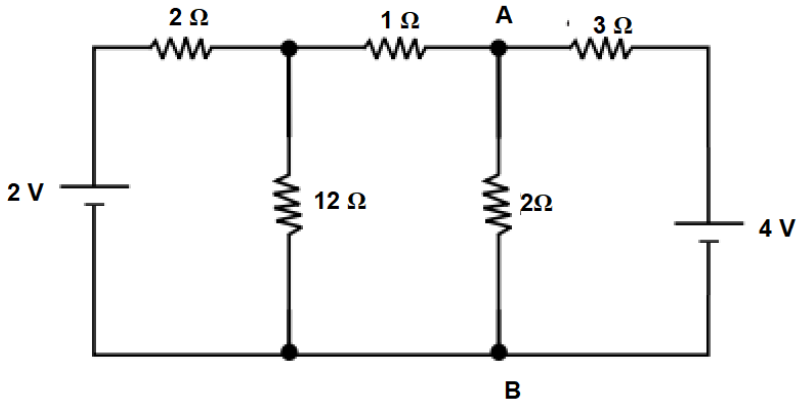
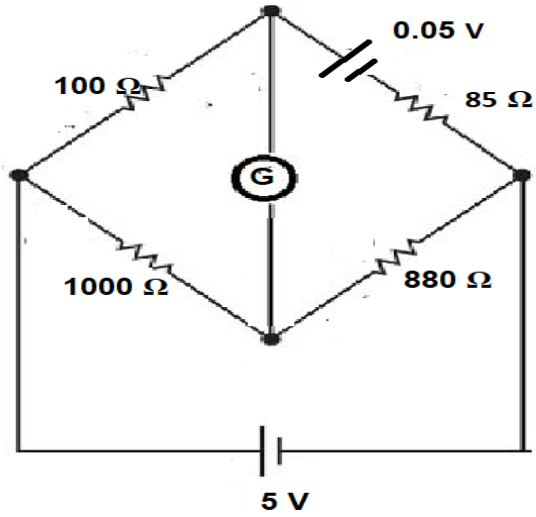
PPH1MC04 – ELECTRONICS I

Date: 04-05-2023 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

	SECTION A		
	Answer ALL the questions		
1	**MCQ**		**(5 x 1 = 5)**
a)	When 2 Ω, 500 Ω, 1000 Ωand 10000Ω are connected in parallel, the equivalent resistance will be a) Greater than 1000Ω and less than 10000Ω b) Greater than 2 Ωless than 500Ω c) Less than 2Ω d) Mean of 500Ω and 1000Ω	K1	CO1
b)	Which semiconductor device acts like a diode and two resistors? a) SCR b) Triac c) Diac d) UJT	K1	CO1
c)	In a 4 bit Johnson's counter the total number of output states or bit patterns are a) 1 b) 3 c) 4 d) 8	K1	CO1
d)	What is the output waveform for a sine wave input?  a) sine b)square c)singular d)sawtooth	K1	CO1
e)	The difference between analog voltage represented by two adjacent digital codes of a digital to analog converter is a) accuracyb)resolutionc)quantization d) precision	K1	CO1
2	**Fill in the blanks**		**(5 x 1 = 5)**
a)	The algebraic sum of all IR drops and EMFs in any closed loop of a network is -------	K2	CO1
b)	In MOSFETs, gate and channel are ---------- from each other.	K2	CO1
c)	EPROM stands for ----------	K2	CO1
d)	The gain of a non-inverting amplifier is Av = ----------	K2	CO1

e)	The output of a particular opamp increases 9V in 12μs. The slew rate is----------	K2	CO1
	SECTION B		
	Answer any THREE of the following in 500 words **(3 x 10 = 30)**		
3	 Calculate the voltage that must be connected across the terminals ab such that the voltage across the 2 Ωresistor is 10V. Determine the voltage across the 6 Ωresistor and hence determine the currents I_1 and I_2 and verify $I = I_1+I_2$.	K3	CO2
4	Discuss the construction and operation of UJT.	K3	CO2
5	Explain the construction and working of a decade counter.	K3	CO2
6	a) Discuss the construction and working of an OPAMP as an invertingamplifier. b) Design an inverting amplifier with gain2.5.**(8+2)**	K3	CO2
7	With a neat diagram explain the working of dual slope A/D converter.	K3	CO2
	SECTION C		
	Answer any TWO of the following in 500 words **(2 x 12.5 = 25)**		
8	 Find the current I using superposition theorem.	K4	CO3
9	Explain the construction and characteristics of a SCR.	K4	CO3
10	Explain with a neat diagram how an OPAMP can be used as an astablemultivibrator.	K4	CO3
11	Explain the construction and working of OPAMP as integrator and differentiator. **(6.5+6)**	K4	CO3
	SECTION D		
	Answer any ONE of the following in 1000 words **(1 x 15 = 15)**		
12	Use Norton's theorem to find the current through the resistor connected between AB.	K5	CO4

			
13	a) Design a MOD 9 counter using flip flops and explain its operation with thetruth table. b) Design a second order high pass filter with cutoff frequency equal to5000Hz. **(10+5)**	K5	CO4
	SECTION E		
	Answer any ONE of the following in 1000 words **(1 x 20 = 20)**		
14	a) Solve the following simultaneous equations using OPAMP, x+y=3; 3y+x=5. b) Use Thevenin's theorem and find the current through galvanometer. The resistance of the galvanometer is 20 Ω.  **(10+10)**	K6	CO5
15	a) Construct a 5 bit R-2R ladder D/A converter and obtain the expression for its output voltage. b) Determine the output voltage for i) 10101 ii) 11000 iii) 01010 iv) 00111 v) 11101 vi) full scale voltage, if R_f = 10kΩ,R = 20kΩ and 0=0V, 1=5V. **(8+12)**	K6	CO5

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