PEC
EXPLORE INNOVATE EXCEL

Punjab Engineering College (Deemed to be University), Chandigarh

Mid-Term Examination

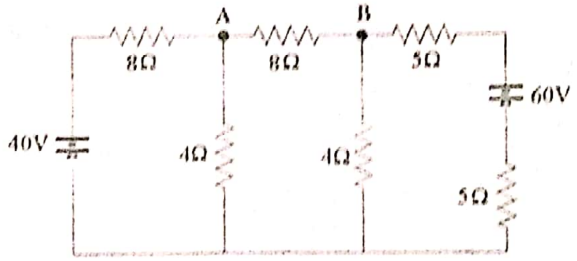
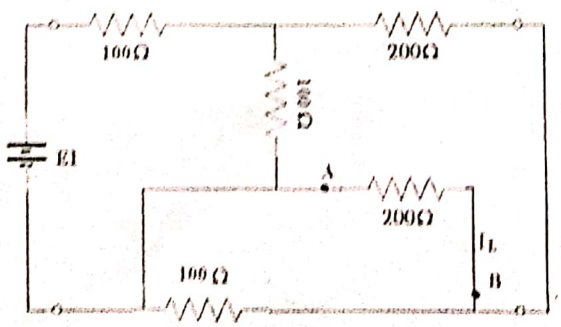
Sept, 2019 QUESTION PAPER-201909

Programme: B.E (Electronics CE)
Course Name: **Basic Electrical Sciences**
Maximum Marks: 60

Year/Semester: 2019/3rd
Course Code: **ESC 206**
Time allowed: **1.5 Hours**

Notes :

(1) All questions are compulsory.
(2) Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any.
(3) The candidates, before starting to write the solutions, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right **course code.**

Q. No			Mark
1.	a)	State and illustrate Kirchhoff's Laws through a suitable example. Also give their areas of application and advantages, disadvantages if any.	(10)
	b)	Determine the current in the Branch AB, using Superposition Theorem. 	(10)
2.	a)	Prove mathematically how maximum power can be transmitted to the load by a DC source. List advantages/ disadvantages; also mention its scope of application.	(10)
	b)	Explain how the given network can be reduced to a single source with internal resistance. Also determine I_L in the resistance 200 ohms across AB. Also determine the value of R_{AB} for maximum power transfer and its magnitude. Take E1 = 150V 	(10)

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3.	a)	In an electrical circuit a capacitor connected to a supply voltage $v = V_m \sin(\omega t)$. Derive an expression for current-voltage relationship and plot voltage, current, power waveforms. List the inferences drawn from these waveforms. Visualize the effect of varying supply frequency from zero to infinite value on circuit characteristics.	(10)
	b)	An electrical circuit comprising of series combination of an incandescent lamp with 100W, 250V rating and a pure coil of 50mH inductance, is connected to single-phase AC supply of 250V, 50Hz. Draw circuit diagram for power measurement with the help of Wattmeter, Voltmeter, ammeter. Determine the reading of Wattmeter, value of power factor. (Hint: may use $W = \frac{V^2}{R}$)	10

Course Instructor: Dr. Balwinder Singh Surjan, Electrical Engineering Department.

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Punjab Engineering College (Deemed to be University), Chandigarh

End-Term Examination

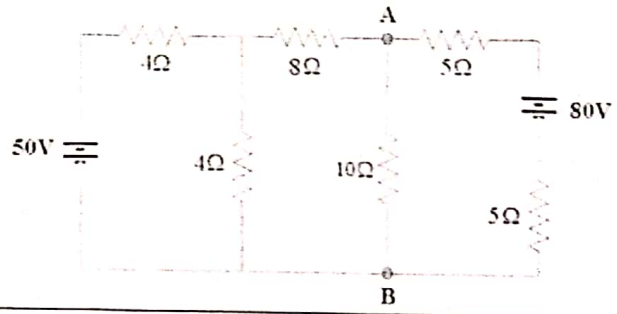
Nov, 2019 QUESTION PAPER-201911

Programme: B.E (Electronics CE)
Course Name: **Basic Electrical Sciences**
Maximum Marks: 100

Year/Semester: 2019/3rd
Course Code: **ESC 206**
Time allowed: **3.0 Hours**

Notes :

(1) All questions are compulsory.
(2) Unless stated otherwise, the symbols have their usual meanings in context with subject. Assume suitably and state, additional data required, if any.
(3) The candidates, before starting to write the solutions, should please check the question paper for any discrepancy, and also ensure that they have been delivered the question paper of right **course code**.

Q. No			Marks
1.	a)	Analyze the effect of variation in flux on speed of a DC motors.	(05)
	b)	Apply Nodal Analysis method through a suitable example. Also mention its advantages, disadvantages if any.	(05)
	c)	Determine the current in the Branch AB, using Norton's Theorem. Define Norton's Theorem also. 	(10)
2.	a)	Draw and analyse phasor diagram of C-L series network energized with AC supply $v = V_m \sin(\omega t)$ supply.	(05)
	b)	Derive relationship between phase and line quantities in a three-phase balanced delta connected network.	(06)
	c)	A 400V, 3-phase system connected to a balanced star connected load with per phase impedance of $40\angle 60^\circ$ Ω. Determine (i) the line voltage and currents (ii) the phase voltage and currents, (iii) phasor diagram showing voltages and currents.	(09)
3.	a)	Define electrical transformer and explain its principle of operation.	(04)
	b)	Write a step-by-step procedure for conducting open-circuit test on a single-phase step-down transformer. Draw circuit diagram to conduct O.C. test also.	(06)
	c)	The following test data is obtained through open-circuit test and short-circuit test on a 230/115V 2.3 kVA, 50Hz, single-phase transformer :	(10)

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Test	Voltage (Volt)	Current (Ampere)	Power (Watts)	Remarks
O.C.	115	0.4	40	Test conducted on LV side
S.C.	10	20	80	Test conducted on LV side

Determine equivalent circuit parameters; construct equivalent circuit referred to High Voltage side.

4	a)	Derive an expression for back e.m.f induced in the DC motor armature while running at rated speed; also mention importance of back e.m.f.	(6)
	b)	Plot torque-speed characteristic of DC shunt motor and DC series motor and explain with the help of an appropriate expression.	(6)
	c)	A 4-pole, lap wound, d.c. shunt generator has a flux per pole of 0.05Wb. The armature winding comprises of 240 turns each of 0.002Ω resistance. Determine the terminal voltage when running at 950 r.p.m., if the armature current is 60A.	(08)
5	a)	Draw and analyse torque-speed characteristic of a three-phase induction motor.	(6)
	b)	A 6-pole, 50Hz, 3-phase, Induction Motor running on full-load with 4% slip develops a torque of 149.3 N-m at its shaft. The friction and windage losses are 200W and the stator copper and iron losses equals 1620W. Determine (a) output power, (b) the rotor copper losses and (c) the rotor and overall efficiency at full load.	(8)
	c)	Classify measuring instruments and explain any one in detail with its application.	(6)

Course Instructor: Dr. Balwinder Singh Surjan, Electrical Engineering Department.

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