GURU NANAK INSTITUTE OF TECHNOLOGY

An Autonomous Institute under MAKAUT

2022-2023

BASIC ELECTRICAL ENGINEERING

EE101

TIME ALLOTTED: 3 HOURS **FULL MARKS: 70**

The figures in the margin indicate full marks.

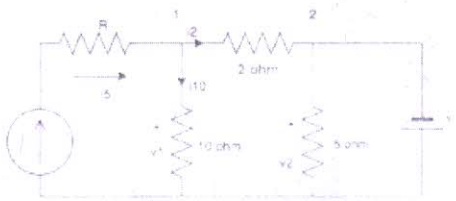
Candidates are required to give their answers in their own words as far as practicable

GROUP – A

(Multiple Choice Type Questions)

Answer any *ten* from the following. choosing the correct alternative of each question: 10×1=10

		Marks	CO No
1. (i)	Find the value of v if v1=20V. Find the value of v if v1=20V and value of current source is 6A.	1	CO1



a) 10 V
b) 2V.
c) 4V
d) 16 V

ii) The type of switch given in the fig. 1 CO3

a) Single pole, single throw
b) Single pole, double throw
c) Double pole, single throw
d) Double pole, Double throw

iii) The armature of DC motor is laminated to _____ 1 CO2
a) To reduce mass
b) To reduce hysteresis loss
c) To reduce eddy current loss
d) To reduce inductance

iv) An ideal transformer will have maximum efficiency at a load such that _____ 1 CO2
a) copper loss< iron loss
b) cannot be determined
c) copper loss = iron loss
d) copper loss> iron loss

v) An ideal transformer will have maximum efficiency at a load such that _____ 1 CO2
a) copper loss > iron loss
b) cannot be determined
c) copper loss = iron loss
d) copper loss< iron loss

vi) If A is the number of parallel paths and P is the number of poles, then the number of parallel path in lap winding and in wave winding is 1 CO1
a) A = P, A = 2
b) A = 2P, A = P
c) A = 2, A = P
d) A = P, A = 2P

vi) Application of Norton's theorem to a circuit yields 1 CO1
a) equivalent current source and impedance in series
b) equivalent current source and impedance in parallel
c) equivalent impedance
d) equivalent current source

viii) In ac circuit the maximum current required is 1 CO1
a) Equal to the effective current
b) 1.414 times the effective current
c) Twice the effective current
d) 1.732 times the effective current

ix) Is a closed loop system. 1 CO4
a) Auto-pilot for an aircraft
b) Direct current generator
c) Car starter
d) Electric switch

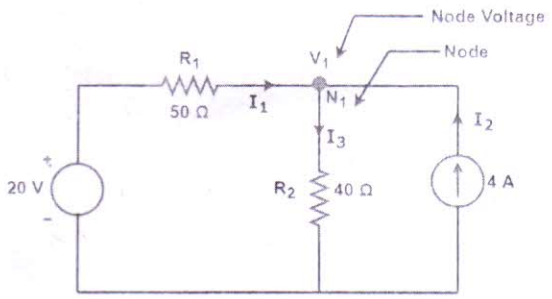
x) Full form of UPS 1 CO4
a) Undersized Power Supply
b) Uninterrupted Power Supply
c) Uneven Power Supply
d) Unwanted Power Supply

xi) A 3-phase 440 V, 50 Hz induction motor has 4% slip. The frequency of rotor current will be 1 CO2
a) 50 Hz
b) 25 Hz
c) 5 Hz
d) 2 Hz

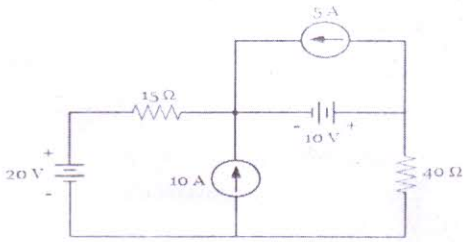
xii) When an ac power is applied to a reactive load, then the voltage is 1 CO1
a) In phase with the current
b) 90 degree out of phase with the current
c) 180 degree out of phase with the current
d) 270 degree out of phase with the current

GROUP – B
(Short Answer Type Questions)
(Answer any *three* of the following) 3x5=15

		Marks	CO No
2.	Derive the emf equation of a DC Generator.	5	CO4
3. a)	Using KCL find all the branch currents following the figure below:	4	CO1



b)	Define KVL.	1	CO1
4.	Find the voltage across through 15 Ω resistor using superposition theorem.	5	CO1

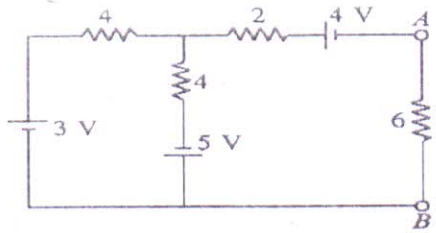


5.	A shunt wound dc generator has an induced voltage of 200 V. The terminal voltage is 180 V. Find the load current if the field and armature resistances are 100 Ohm and 0.1 Ohm.	5	CO2
6.	A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm^2. The primary winding is connected to a 500V supply. Find (i) peak value of the core flux density and the (ii) emf induced in the secondary winding.	5	CO2

GROUP – C
(Long Answer Type Questions)
(Answer any *three* of the following) 3x5=15

		Marks	CO No
7. a)	Draw and explain the phasor diagram of single phase transformer under lagging power factor.	4	CO2
b)	A single phase transformer has 400 primary and 1000 secondary turns. The net cross sectional area of the core is 60 cm^2. The primary winding is connected to a 500V supply. Find (i) peak value of the core flux density and the (ii) emf induced in the secondary winding.	5	CO2

c)	A DC series motor draws full load armature current of 5 A from 220 V DC supply and runs at a full load speed of 500 rpm. If its armature is 1 ohm and field resistance is 20 ohms then calculate its speed (in RPM) when it is half loaded.	6	CO2
8. a)	What is the condition for maximum power transfer in DC circuit? Explain.	5	CO1
b)	For the circuit shown in Fig., calculate the current in the 6 ohm resistance by using Norton's theorem.	5	CO1



c)	State and explain Norton's Theorem with suitable diagram.	5	CO1
9. a)	Derive the RMS value & Average value.	5	CO1
b)	Draw the phasor diagram for series RL and RC circuit and also draw the impedance triangle for series RL circuit.	5	CO1
c)	When a resistor and coil in series are connected to a 240V supply, a current of 5A in flowing lagging 60 degree behind the supply voltage, and the voltage across the coil is 220V. Find the resistance of the resistor an resistance and reactance of the coil.	5	CO1
10. a)	Draw and explain the block schematic representation of Thermal power plants	5	CO4
b)	Write about the difference between single-phase and three-phase system. What is the relation between line and phase current in case of delta connected network.	5	CO4
c)	Write down the definition i) Amplitude ii) Cycle iii) Time Period iv) Phase Difference v) Phase Angle	5	CO3
11.	Write a short note on (any three) :	5x3 =15	
a)	Parallel Resonance	5	CO1
b)	Earthing of Electrical Equipment	5	CO3
c)	Ideal Transformer	5	CO2
d)	Renewable energy sources	5	CO4
e)	Star-Delta Conversions	5	CO3