DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
SECOND SESSIONAL
SUBJECT: (ESC104) BASIC ELECTRICAL ENGINEERING

Examination	: B.Tech Semester I (ICT)	Seat No.	: 32
Date	: 13/12/2022	Day	:Tuesday
Time	: 3:45pm to 5:00pm	Max. Marks	: 36

INSTRUCTIONS:

Figures to the right indicate maximum marks for that question.
The symbols used carry their usual meanings.
Assume suitable data, if required & mention them clearly.
Draw neat sketches wherever necessary.

Q.1 Do as directed. **[12]**

CO2	U	(a)	Norton's resistance can be calculated by _____ voltage sources and _____ current sources.	[2]
CO2	A	(b)	What is the time constant of the series RC circuit with R = 1KΩ, C = 220 μF and supply voltage is of 15 V?	[2]
CO2	A	(c)	What is the form factor of a 110 V, 60 Hz sinusoidal waveform?	[2]
CO6	R	(d)	Which material is used to construct core of transformer? Why?	[2]
CO6	A	(e)	A single phase transformer is connected to 2000 V, 50 Hz supply. It has 600 primary turns and 150 secondary turns. Find out secondary voltage on open circuit and Maximum value of flux in core	[2]
CO6	A	(f)	Two coils with a coefficient of coupling of 0.7 between them are connected in series so as to magnetize (i) in the same direction (ii) in the opposite direction. The corresponding values of total inductances are for (i) 2.4 H and for (ii) 0.9 H. Find the the mutual inductance between them.	[2]

Q.2 Attempt ***Any TWO*** from the following questions. **[12]**

CO7	A	(a)	A balanced star connected load of (8+ j10) Ω impedance is connected to 400 V, 60HZ, three phase supply. Find out phase voltage and phase current. Also calculate the real power, reactive power and apparent power consumed by the load?	[6]
CO7	A	(b)	A 11 KVA, 220/440 V, 50 Hz transformers have an iron loss of 200 W and full load copper loss 300 W. Find out efficiency at unity power factor and 0.8 power factor lagging. Also find out its regulation if full load output voltage is 410 V.	[6]
CO7	A	(c)	A 6 KVA, 250/500 V, 50 Hz, single phase transformer has primary resistance and secondary resistance 0.5 ohm and 0.7 ohm respectively. Find out primary copper loss, secondary copper loss and total copper loss.	[6]

Q.3 **Attempt following questions.** **[12]**

CO2	A	(a)	Find the current flowing through 6Ω resistor of circuit shown in Fig. 1 using Thevenin's theorem. (all resistors are in ohms)	[6]
CO6	U	(b)	Explain the working of single phase transformer with the help of diagram. Also draw its equivalent circuit.	[6]

OR

CO2	A	(a)	Calculate the current flowing through 10 Ω resistor of circuit shown in Fig. 2 using Delta Star transformation. (all resistors are in ohms)	[6]
CO6	U	(b)	Discuss Magnetic material types in detail.	[6]

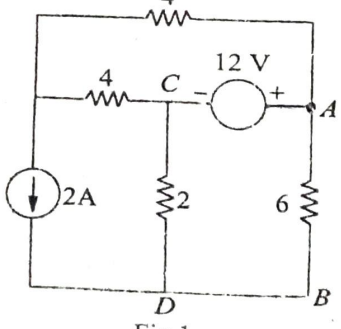

Fig.1

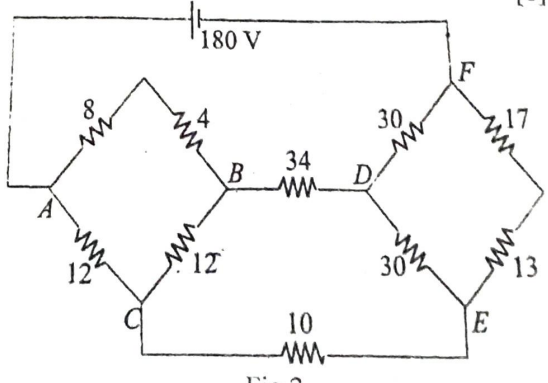

Fig.2

Blooms Taxonomy levels : R-Remembering, U- Understanding, A-Applying, N-Analyzing, E- Evaluating, C-Creating