

# CBCS SCHEME

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BESCK204B/ BESCKB204

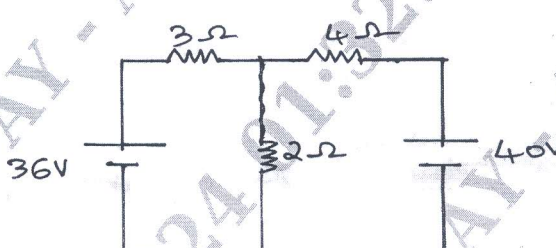
**Second Semester B.E./B.Tech. Degree Examination, June/July 2024**

## Introduction to Electrical Engineering

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.  
 2. VTU Formula Hand Book is permitted.  
 3. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	With the help of single line diagram, explain the electrical power transmission and distribution system.	6	L2	CO1
	b.	Explain the working of hydro power generation using suitable block diagram.	8	L2	CO1
	c.	Two resistances $20\Omega$ and $40\Omega$ are connected in parallel. A resistance of $10\Omega$ is connected in series with the combination. A voltage of $200V$ is applied across the circuit. Find the current in each resistance and the voltage across $10\Omega$ .	6	L3	CO1
<b>OR</b>					
Q.2	a.	State and explain KCL and KVL with illustration for each.	6	L2	CO1
	b.	With a neat block diagram, explain the working of wind power generation.	8	L2	CO1
	c.	Using Kirchoff's law find the loop currents and voltage across each resistance.	6	L3	CO1
					
		Fig.Q.2(c)			
<b>Module - 2</b>					
Q.3	a.	A pure capacitor is excited by sinusoidal varying AC voltage, show that the average power consumed by capacitor is zero.	8	L2	CO1
	b.	Define : i) Active power ii) Reactive power iii) Apparent power.	6	L1	CO1
	c.	A coil having a resistance of $7\Omega$ and inductance of $31.8mH$ is connected to $230V$ , $50Hz$ supply. Calculate: i) The circuit current ii) Phase angle iii) Power factor iv) Power consumed.	6	L3	CO2

OR

Q.4	a.	Derive an equation for the power consumed by a R-L series circuit. Draw the waveform of voltage, current and power.	8	L2	CO1
	b.	Explain the generation of three phase ac and list the advantages.	6	L2	CO2
	c.	A circuit consists of a resistance of $10\Omega$ , inductance of $16\text{mH}$ and a capacitor of $150\mu\text{F}$ connected in series. A supply of $100\text{V}$ at $50\text{Hz}$ is given to the circuit. Find the i) Current ii) Power factor iii) Power consumed by the circuit.	6	L3	CO2

Module – 3

Q.5	a.	With the help of neat diagram, explain the construction of DC generator.	8	L2	CO3
	b.	With usual notations, derive the torque equation of a DC motor.	6	L2	CO4
	c.	The emf generated in the armature of a shunt generator is $625\text{V}$ , when delivering its full load current of $400\text{A}$ to an external circuit. The field current is $6\text{A}$ and the armature resistance is $0.06\Omega$ . What is the terminal voltage?	6	L3	CO4

OR

Q.6	a.	Explain the characteristics of DC shunt motor.	6	L2	CO3
	b.	Classify the DC generator types. Derive EMF equation of the DC generator.	8	L2	CO4
	c.	A $200\text{V}$ , 4 pole, lap wound DC shunt motor has 800 conductors on its armature. The resistance of the armature winding is $0.5\Omega$ and that of the shunt field winding is $200\Omega$ . The motor takes $21\text{A}$ and flux/pole is $30\text{mWb}$ . Find: i) Speed ii) Gross torque.	6	L3	CO4

Module – 4

Q.7	a.	Explain the operation of single phase transformer. Classify types of transformers.	8	L1	CO4
	b.	Explain the concept of rotating magnetic field in a 3 phase induction motor.	6	L2	Co4
	c.	A single phase $25\text{KVA}$ , $2000/1000\text{V}$ , $50\text{Hz}$ transformer has a maximum efficiency of $98\%$ at full load unity power factor. Determine its efficiency at i) $3/4^{\text{th}}$ full load unity power factor ii) $1/2$ full load $0.8$ power factor.	6	L3	CO4

OR

Q.8	a.	Explain the construction and working of 3-phase induction motor.	8	L2	CO4
	b.	With usual notation, derive an EMF equation of single phase transformer.	6	L2	CO4
	c.	A 4 pole three phase, $50\text{Hz}$ induction motor runs at a speed of $1470\text{rpm}$ . Find the i) Synchronous speed ii) Slip iii) Frequency of the induced emf in the rotor under this condition.	6	L3	CO4

## Module – 5

Q.9	a.	With neat wiring diagram and truth table explain three way control of lamp.	6	L2	CO5
	b.	What is Earthing? With a neat diagram, explain pipe earthing.	8	L2	CO5
	c.	Write the characteristics of a tariff and explain two part tariff.	6	L2	CO5

## OR

Q.10	a.	Define electric shock. List the safety precautions to avoid shock.	6	L2	CO5
	b.	Explain the working principle of fuse and miniature circuit breaker.	8	L2	CO5
	c.	Explain the different types of wiring connections.	6	L2	CO5

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