

**SHAMBHUNATH INSTITUTE OF ENGINEERING AND TECHNOLOGY, PRAYAGRAJ**

**Subject Code: BEE101**  
**Course: B.Tech.**

**Subject: Fundamentals of Electrical Engineering**  
**Semester : I<sup>st</sup>**

**SECOND SESSIONAL EXAMINATION, ODD SEMESTER, (2024-2025)**

Branch: All

Time -2hrs

**Maximum Marks – 45**

1. Attempt any FIVE questions.

Q N	QUESTION	Marks	CO	BL
a.	What do you understand by the term “Ideal transformer”?	2	CO3	L1
b.	How mmf is related to reluctance?	2	CO3	L1
c.	What will happen if the primary of a transformer is connected to DC supply?	2	CO3	L1
d.	Write any three analogy between magnetic circuit and electric circuit	2	CO3	L1
e.	Draw the no load phasor diagram of an ideal transformer.	2	CO3	L2
f.	What is the voltage regulation in a single phase transformer?	2	CO3	L1

2. Attempt any ONE of the following.

Q.N	QUESTION	Marks	CO	BL
a.	Derive an expression for the emf induced in a transformer winding.	5	CO3	L5
b.	In a 20 kVA, 2000/200V transformer, the iron and copper losses are 100 W and 400 W respectively. Calculate the efficiency of transformer at half load and 0.8 pf lagging.	5	CO3	L3
c.	Calculate the regulation of a transformer in which ohmic drop is 3% and reactance drop is 4% of the voltage when power factor is- (i) 0.8 lagging (ii) 0.8 leading	5	CO3	L3

3. Attempt any FIVE questions.

Q N	QUESTION	Marks	CO	BL
a.	Enlist various methods of starting of single phase induction motor.	2	CO4	L1
b.	How can we change the direction of rotation of DC motor?	2	CO4	L1
c.	Why dc series motor is never started on no load?	2	CO4	L1
d.	What is the relation between frequencies of stator & rotor currents in three phase induction motor?	2	CO4	L1
e.	Define slip in three phase induction motor.	2	CO4	L1
f.	What is the difference between asynchronous and synchronous machine.	2	CO4	L2

4. Attempt any ONE of the following.

Q N	QUESTION	Marks	CO	BL
a.	A 4-pole dc shunt generator with lap connected armature has field and armature resistances of $80\ \Omega$ and $0.1\ \Omega$ respectively. It supplies power to 50 lamps rated for 100 volts, 60 watts each. Calculate the total armature current and the generated emf by allowing a contact drop of 1 volt per brush.	5	CO4	L3
b.	Draw and explain torque-slip characteristic of an induction motor.	5	CO4	L2
c.	A 3-phase, 50Hz induction motor has 6 poles and operates with a slip of 5% at a certain load. Determine (i) The speed of rotor with respect to the stator. (ii) The frequency of the rotor current. (iii) The speed of the rotor magnetic field with respect to the stator.	5	CO4	L3

**P.T.O.**

5. Attempt any FIVE questions.

Q.N	QUESTION	Marks	CO	BL
a.	Write full form of (i) MCB (ii) MCCB (iii) ELCB (iv) SFU.	2	CO5	L1
b.	What do you mean by battery backup?	2	CO5	L1
c.	Why Earth pin is made thicker and bigger than line and neutral?	2	CO5	L1
d.	What do you mean by capacity of a battery?	2	CO5	L1
e.	What is the difference between primary and secondary batteries?	2	CO5	L1
f.	What do you mean by bus-bar?	2	CO5	L1

6. Attempt any ONE of the following.

Q.N	QUESTION	Marks	CO	BL
a.	An alkaline cell is discharged at a steady current of 5 A for 10 hours, the average terminal voltage being 1.2 V. To restore it to original state of voltage, a steady current of 3 A for 15 hours is required, the average terminal voltage being 1.44 V. Calculate the ampere-hour and watt-hour efficiencies in this particular case.	5	CO5	L3
b.	What do you understand by earthing? Why is it provided? Draw a neat sketch of pipe earthing.	5	CO5	L2
c.	Name the various cables used in electrical system based on insulation. Explain any two.	5	CO5	L2

Bloom's Taxonomy Level (BL):-

Remember (L1), Understanding (L2), Apply (L3), Analyze (L4), Evaluating (L5), Creating (L6)