KERALA AGRICULTURAL UNIVERSITY
B. Tech. (Food Technology) 2025 Admission
I Semester Final Examination – February 2026

FMP 1115 **Basic Electrical Engineering (2+1)** **Marks: 50**
Time: 2 hours

I **Fill in the blanks** **(10x1=10)**

1. An alternating voltage is given by V=100 Sin(314t) volts. Its average value is .....
2. The slip of induction motor at synchronous motor will be .....
3. The direction of rotation of an induction motor depends upon the .....

Answer the following

4. Define Transformer.
5. Write the 3-Phase active power expressions for star and Delta connections in line and phase parameters.
6. Define Power factor.

Match the following

7.

Quantity	Reciprocal
1. Resistance	a. Admittance
2. Reactance	b. Seimen
3. Impedance	c. Conductance
4. Ohm	d. Susceptance

8.

Motor	Application
1. DC Shunt motor	a. Electric Trains
2. DC Series motor	b. Belt drive
3. DC Differential compound motor	c. Flywheel drive
4. DC Cumulative compound motor	d. Experimental and research work

State True or False for the following statements.

9. (i) A transformer has frictional and windage losses.
   (ii) The emf induced in a transformer is directly proportional to the product of number of turns and rate of change of flux.
10. (i) For a fixed power and voltage, power factor is directly proportional to load current.
    (ii) Fuse is provided only in phase wire, never on neutral wire.

II **Write short notes on ANY FIVE of the following** **(5x2=10)**

1. Two resistors are connected in series have an equivalent resistance of 18Ω, and when connected in parallel have an equivalent resistance of 4Ω. Find the values of two resistances.
2. Derive the expressions for energy stored in inductor and capacitor.
3. Derive the relation between the line current and phase current for a delta connected 3-Phase AC system with a neat phasor diagram.
4. The efficiency of a 230/110V, 5KVA transformer is 85%. Determine the output power and losses in the transformer.
5. Write a short note on "Armature reaction".
6. Write a short note on "Double Field revolving theory".
7. What are the factors to consider in the selection of Electrical wiring system.

III **Answer ANY FIVE of the following** **(5x4=20)**

1. Four resistors 80 Ω, 50Ω, 25Ω and **R** are connected in parallel. What is the value of **R** so that the current through 25Ω resistance is 4A, and total current of the supply is 10A.
2. Two coils connected in series have an equivalent inductance of 0.8H when connected in aiding, and an equivalent inductance of 0.5H when the connection is in opposing. Calculate the mutual inductance of the coil.
3. A balanced Delta connected load of $(2 + j3)$ Ω per phase is connected to a balanced 3-ϕ, 440V supply. The phase current is 10A. Find Total Active and Reactive Powers and power factor.
4. Describe how OC and SC tests facilitate to construct the equivalent circuit of a 1-ϕ transformer.
5. Explain the speed control methods of DC shunt motor.
6. Explain the production of rotating magnetic field in 3-ϕ Induction Motor.
7. Discuss the effects/disadvantages of Low power factor.

IV **Write an essay on ANY ONE of the following** **(1x10=10)**

1. Prove that the total power and power factor in a 3-ϕ System can be determined using two-wattmeter method with the equivalent circuit and phasor diagrams.
2. Discuss the working principle and constructional details of DC Generator with the help of suitable diagrams.

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