



KERALA AGRICULTURAL UNIVERSITY
B.Tech.(Agrl. Engg.) 2022 & Previous Admissions
III Semester Final Examination - February 2024

Fpme.2105

Electrical Machines and Power Utilization (2+1)

Marks: 50
Time: 2 hours

I Fill in the blanks (10x1=10)

1. In case of a rotating electrical machine, the winding on the machine that carries only the load current is called
2.winding is preferred for rotating electrical machines having low voltage and high current capacity.
3. In a synchronous machine, the damper winding comes into play only during, when rotor speed departs from synchronous speed.
4. For a transformer, the information about ohmic loss at rated current and frequency as well as equivalent resistance and equivalent leakage reactance can be obtained by conductingtest.
5. DC and AC generators are similar in one important respect, that is, they both generateemf in the armature conductors.
6. Shaded pole motors are simple in construction and cheap, but they have starting torque.
7. When the armature current flows in to the generated emf, dc machine operates in motoring mode.
8. The percentage slip of an induction motor having 6 poles fed with 50Hz supply and rotating with an actual speed of 960 rpm is
9. Two wattmeters connected to measure the power input to a balanced three-phase circuit indicate 4.5 kW and 3.0 kW, respectively. The power factor of the circuit is equal to
10. In speed control of DC motors, a smooth variation of speed from zero to above normal with inherent stability of speed at all loads is achieved through an adjustable voltage system of speed control. This speed control is well known as system of speed control.

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

1. Why do the neutral conductors normally have a smaller cross-section compared to the supply line conductors?
2. Why should a DC series motor never be operated without a load?
3. How can the direction of rotation be reversed for the capacitor-start, induction-run motor?
4. Why and how does noise occur in a power transformer?
5. Why are alternators rated in kVA or MVA instead of kW or MW?
6. How is an artificial neutral formed to measure the phase voltages in a three-phase three-wire system?
7. A three-phase induction motor takes a current of 100A from 400V 50Hz supply. If the output of the motor is 70 H.P and the efficiency is 90%, determine the power factor.

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

1. What are the four conditions that must be fulfilled for a self-excited DC generator to build up voltage, assuming the DC generator is in sound condition?
2. Why is DC shunt generator called constant voltage generator? Write the name of at least four constant loads for which such generator can be used.
3. What are the four conditions that must be fulfilled for satisfactory parallel operation of two or more single phase transformers?
4. What are the four key differences between lap winding and wave winding?

5. Explain the necessity of star-delta starter for three phase squirrel cage motor.
6. Outline the four main characteristics of a resonance in series RLC circuit.
7. What do you mean by jogging (inching)? Illustrate some jogging (inching) controls used for practical application.

IV

Write an essay on ANY ONE of the following

(1x10=10)

1. Explain the principle of speed control in DC motors. Illustrate the armature control method with the help of a circuit diagram along with its advantages and disadvantages.
2. What useful information are obtained from the open circuit and short-circuit test in a single phase two winding transformer? Outline the procedure for performing the open circuit and short-circuit test.
