Department of Electrical Engineering, IIT (ISM) Dhanbad

Quiz-2 (Monsoon Semester 2022-23), UG 1st Year Common (Sections: A, B, C, D)

Basics of Electrical Engineering (EEI101) Maximum Marks: 20 M

Date: 14/12/2022, 7:15 PM Duration: 30 Minutes

A

Name of the Student	Admn. Number	Signature

Section-I – Answer all Questions (1 Mark Each)

Q1. In an ideal transformer all the flux produced by primary winding ____________ . **[1M]**

a) is confined within core and linked with secondary winding
b) is not confined within core and not linked with secondary winding
c) links only the primary winding itself
d) may or may not be confined within the core

Q2. A 2.3 kVA single phase ideal transformer is connected to a 230 V, 50 Hz AC supply. It has primary to secondary turns ratio 1:10. What is the secondary side current when the transformer is operating at rated load condition? **[1M]**

a) 10 A b) 1 A c) 100 A d) 1000 A

Q3. The two-wattmeter method of measuring power can be used _________ three-phase circuits. **[1M]**

a) for only balanced b) for only unbalanced
c) for both unbalanced and balanced d) for only balanced star-connected

Q4. The phase currents of a balanced delta-connected three-phase load are in phase with the line-to-line voltages. If the same load impedances are connected in star across the same supply, the phase currents ________ the line-to-line voltages. **[1M]**

a) remain in phase with b) leads
c) lags d) are zero irrespective of

Q5. The phase currents in each of the three phases of a star-connected three-phase load fed by a three-phase four-wire system are 10-j5 A. The system is _____________ . **[1M]**

a) balanced
b) unbalanced

Q6. Transformer core is constructed using steel laminations ____________. **[1M]**

a) to reduce Eddy current loss
b) to reduce Hysteresis loss
c) to reduce volume and weight of core
d) to increase flux density level in the core

Q7. Three impedances are used to make a balanced three-phase load. The ratio of the magnitude of phase currents when these impedances are connected in star to the magnitude of phase currents when these are connected in delta is: **[1M]**

a) 3:1 b) $1:\sqrt{3}$ c) $\sqrt{3}:1$ d) 1:1

Q8. Synchronous speed in an Induction Motor _____________. **[1M]**

a) is the speed at which resultant magnetic field rotates inside the motor
b) is the speed of the rotor
c) is the difference of speed between rotating magnetic field and rotor
d) is the full load speed of the motor

Section-II – Answer All Questions (2 Marks Each)

Q9. A single phase 240 V, 50 Hz transformer is operating under no-load condition. The core loss in the transformer is 120 W and operating power factor is 0.4 lagging. Find the magnitude of magnetizing (I1) and core-loss (I2) components of currents. **[2M]**

a) I1 = 1.145 A & I2 = 0.5 A

b) I1 = 0.50 A & I2 = 1.145 A

c) I1 = 1.145 A & I2 = 1.25 A

d) I1 = 1.250 A & I2 = 0.5 A

Q10. A three-phase star-connected load has a power factor of 0.866 lagging. It draws a line current of 50 A when supplied with a 400 V three-phase AC supply. When its power is measured by the two-wattmeter method, the readings of the two-wattmeters would be: **[2M]**

a) 17.32 kW and 17.32 kW b) 11.54 kW and 5.77 kW

c) 8.65 kW and 8.65 kW d) 20 kW and 10 kW

Q11. A single phase transformer has volt per turn as 12 V/turn. It is supplied by a single phase 2400 V, 50 Hz supply. The primary to secondary turns ratio is 10:1. What are the peak value of flux (ϕ) in the core and Number of turns (N2) in the secondary side? **[2M]**

a) ϕ = 0.054 Wb & N2 = 20 b) ϕ = 0.054 Wb & N2 = 200

c) ϕ = 0.90 Wb & N2 = 20 d) ϕ = 0.90 Wb & N2 = 200

Q12. Find the power drawn by a delta-connected load having a per-phase impedance of $128\angle -45^\circ\ \Omega$ when fed from a three-phase supply of 400 V. **[2M]**

a) 1.5 kW b) 0.88 kW c) 2.65 kW d) 3.78 kW

Q13. A three-phase 200 V, 50 Hz source delivers 10 kW power to a balanced star-connected load. The power factor of the system is 0.707 lagging. The magnitude of the current flowing in each phase is: **[2M]**

a) 70.7 A b) 40.8 A c) 23.5 A d) 16.6 A

Q14. A three-phase 6 pole, induction motor is rotating with 3% slip. Supply frequency is 50 Hz. Calculate the synchronous speed (Ns) and the frequency of rotor current (fr) in Hz. **[2M]**

a) Ns = 1500 rpm & fr = 50 Hz

b) Ns = 1500 rpm & fr = 3.0 Hz

c) Ns = 1000 rpm & fr = 50 Hz

d) Ns = 1000 rpm & fr = 1.5 Hz