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Question Paper Code:U4401

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Electrical and Electronics Engineering

21UEE401- ELECTRICAL MACHINES II

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer All Questions

PART A - (10 x 1 = 10 Marks)

- Which of the following represents the pitch factor? CO1-U
(a) $\cos \alpha$ (b) $\cos (2\alpha)$ (c) $\cos (\alpha/2)$ (d) $\sin (\alpha/2)$
- What kind of rotor is most suitable for turbo alternators ? CO1- U
(a) Salient pole type (b) Non-salient pole type
(c) both type (d) none of the above
- The crawling in the induction motor is caused by CO2-U
(a) High Loads (b) Low Voltage supply
(c) Harmonic developed in the motor (d) Improper design of machine
- What is the condition for maximum torque? CO2-U
(a) $R_2 = X_2$ (b) $R_2 = sX_2$ (c) $R_2 = 1/X_2$ (d) $R_2 = X_2^2$
- Which type of starter is used in Pumps and Compressors? CO3-U
(a) DOL Starter (b) Star Delta Starter (c) Auto Transformer Starter (d) All the above
- Which method provides wide range of speed control, of Induction Motor? CO3-U
(a) Cascade control (b) Stator voltage control
(c) Pole changing method (a) Rotor Resistance Control
- Hunting in a synchronous motor takes place on CO4-U
(a) When load varies (b) When supply voltage fluctuates
(c) When power factor is unity (d) Motor is under loaded

8. With the increase in the excitation current of synchronous motor the power factor of the motor will CO4-U
- (a) Improve (b) Decrease
(c) Remain constant (d) Depend on other factors
9. Capacitor in split phase induction motor is used for CO5-U
- (a) improving the power factor (b) starting the motor
(c) reducing the for harmonics (d) None of the above
10. Which type of motor used in wrist watches? CO5-U
- (a) Universal motor (b) Stepper motor (c) Reluctance motor (d) None of the above

PART – B (5 x 2= 10 Marks)

11. What are the functions of damper winding? CO1- U
12. Outline the condition for maximum torque for three-phase induction motor CO1- U
13. Summarize the advantages of Rotor Resistance Speed Control. CO1- U
14. Explain what happens when the load on a synchronous motor is changed? CO1- U
15. Mention the applications of Linear Induction motor. CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) A 3300V, 3phase star connected alternator has a full load current of 100A. On short circuit a field current of 50A was necessary to produce full load current. The emf on open circuit for the same excitation was 900V. The armature resistance was 0.8Ω/phase. Analyze the full load voltage regulation for the following load conditions CO2 - Ana (16)
- (1) 0.8pf lagging (2) 0.8pf leading load.
- Or
- (b) A 3-phase star connected alternator is rated at 1600kVA, 13500V. The alternator effective resistance and synchronous reactance are 1.5 Ω and 30 Ω per phase respectively. Analyze the performance of the machine based on its percentage regulation for a load of 1280 kW at power factors of i) 0.85 lagging ii) 0.85 leading. CO2 - Ana (16)
17. (a) Draw and explain Slip Torque characteristics of induction motor with the effect of changing Rotor resistance. CO1 - U (16)
- Or
- (b) Explain the equivalent circuit of Induction motor. CO1 - U (16)

18. (a) Explain in detail about the slip power recovery scheme. CO1 -U (16)
Or
(b) Explain the speed control of a three phase induction motor using voltage control and frequency control. CO1 -U (16)
19. (a) Explain the torque equation of synchronous motor. CO1 -U (16)
Or
(b) Illustrate the various methods of starting of synchronous motor. CO1 -U (16)
20. (a) Perform no-load test and blocked rotor test for obtaining the equivalent circuit parameters of a single-phase induction motor. CO1- U (16)
Or
(b) Explain shaded pole induction motor with neat diagram. Mention its applications. CO1- U (16)

