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Question Paper Code: 54032

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2017

Fourth Semester

Electrical and Electronics Engineering

15UEE402 - AC MACHINES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The effect of increasing the length of air gap in induction motor will be to increase the
(a) Power factor (b) speed (c) magnetizing current (d) air-gap flux
2. The efficiency of a 3-phase induction motor is approximately proportional to
(a) (1-s) (b) s (c) N (d) Ns
3. For the purpose of starting an induction motor, a Y- Δ switch is equivalent to an auto-starter of ratio _____ percent.
(a) 33.3 (b) 57.7 (c) 73.2 (d) 60
4. Two separate induction motors having 6 poles and 5 poles respectively and their cascaded combination from 60 Hz, 3 ϕ supply can give the following synchronous speeds n rpm.
(a) 720, 1200, 1500 and 3600 (b) 720, 1200, 1800
(c) 600, 1000, 15000 (d) 720 and 3000
5. Armature reaction in an alternator primarily affects
(a) Rotor speed (b) terminal voltage per phase
(c) frequency of armature current (d) generated voltage per phase

6. The voltage regulation of an alternator having 0.75 leading p.f. load ,no load induced emf of 2400V and rated terminal voltage of 3000V is _____ percent.
- (a) 20 (b) -20 (c) 150 (d) -26.7
7. The direction of rotation of a synchronous motor can be reversed by reversing
- (a) Current to the field winding (b) supply phase sequence
- (c) polarity of rotor poles (d) none of these
8. The V-curves of a synchronous motor show relationship between
- (a) Excitation current and back emf
- (b) field current and p.f
- (c) dc field current and ac armature current
- (d) armature current and supply voltage
9. Speed of universal motor is
- (a) Dependent on frequency of supply
- (b) proportional to frequency of supply
- (c) independent of frequency of supply
- (d) none of above
10. A repulsion motor is equipped with
- (a) commutator (b) slip rings
- (c) a repeller (d) neither (a) or (b)

PART - B (5 x 2 = 10 Marks)

11. What are the advantages and disadvantages of circle diagram method of predetermining the performance of 3 –phase I M?
12. What is cogging of an induction motor?
13. Why is the MMF method of estimating the voltage regulation is considered as the optimization method?
14. What is synchronous condenser?
15. State some application of universal motor.

PART - C (5 x 16 = 80 Marks)

16. (a) Draw the equivalent circuit and derive expressions for maximum torque and power of a three phase induction motor. (16)

Or

- (b) Sketch and explain the torque slip characteristics of the 3 ϕ cage and slip ring induction motors. Show the stable region in the graph. (16)

17. (a) Why starters are necessary for starting 3 ϕ induction motors? What are the various type of starters? Explain star delta type starter in detail. (16)

Or

- (b) With neat diagram explain the slip power recovery scheme. (16)

18. (a) Explain the EMF and MMF method of evaluating the synchronous reactance. (16)

Or

- (b) (i) Describe how to obtain voltage regulation by ZPF method. (8)

- (ii) Discuss briefly the two reaction theory for salient pole machine. (8)

19. (a) Illustrate through neat phasor diagram the functioning of synchronous machine with varying excitation under constant real power load. (16)

Or

- (b) Illustrate the phenomenon of hunting and the use of damper winding with help of dynamic equations. (16)

20. (a) Explain the double field revolving theory for operation of single phase induction motor. (16)

Or

- (b) (i) Obtain equivalent circuit of single phase induction motor. (8)

- (ii) Discuss about the working of reluctance motor. (8)

