



R17 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 1P3BC

B.Tech II Year I Semester Supplementary Examinations, February 2021
Electrical Machines-I

(Electrical and Electronics Engineering)

Maximum Marks: 70

Date: 24.02.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 List the functions of compensating windings in DC machines ?
- 2 Define Commutation in DC Generators?
- 3 What is the need for starter in a DC Motor?
- 4 State the applications of DC Shunt Motor and DC Series Motor?
- 5 State the Merits and Demerits of the Swinburne's method?
- 6 Explain "why the generator field is connected in series to the Motor armature while conducting field's Test on DC series Machines"?
- 7 Define Transformer and classify different types of transformer?
- 8 Write any 4 differences between Power and Distribution Transformers?
- 9 List the advantages and disadvantages of Star-Delta connection of transformers?
- 10 Give the conditions to be fulfilled for paralleling three phase transformers?

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 (a) Discuss the constructional details of 4-pole DC Generator with a neat sketch?[5M]
(b) A DC Machine has 8 poles, lap connected armature with 920 conductors and flux per pole is 30 mWb. It is driven at 400rpm. Calculate the generated emf. If now lap connected armature is replaced by wave connected, Calculate the speed at which it should be driven to generate 400V. [5M]

OR

- 12 (a) Derive the equation to calculate De-magnetizing and Cross Magnetization Ampere Turns per pole? [6M]
(b) A 250 KW, 400 V, 4 pole dc generator has 720 lap wound conductors. It is given a brush lead of 3 angular degrees(mech.) from the geometrical neutral. Calculate the cross and demagnetizing ampere turns per pole. Neglect the shunt field current? [4M]
- 13 Explain the working principle of 4-point starter with a neat sketch. Also explain about protective measures embedded in the starter?[10M]

OR

- 14 Explain any two methods of speed control of DC Shunt Motor with neat sketches?[10M]

- 15 With a neat sketch, Explain the determination of efficiency of DC shunt motor using Brake Test? [10M]
- OR
- 16 a) With appropriate diagrams, explain how to determine the efficiency of DC Shunt machines using Hopkinson's Test? [5M]
- b) A 200 V DC Shunt motor when tested by Swinburne's test gave the following results:
Running Light: $I_{ao} = 6.5$ A and $I_f = 2.2$ A
Rotor Locked : The current was 70 A and voltage of 3V at the brushes.
Determine the efficiency of motor when working under full load conditions? [5M]
- 17 a) Describe the effect of Frequency and supply voltage on Core losses [5M]
- b) A single phase transformer has 400 primary and 1000 secondary turns. The Net cross sectional area of the core is 60cm^2 . If the primary winding be connected to a 50 hz supply at 500V, calculate
- (i) The Peak value of the flux density in the core
(ii) The voltage induced in the secondary winding. [5M]
- OR
- 18 Explain the constructional features and working of a Single phase transformer with a neat sketch? [10M]
- 19 a) Explain load sharing by two transformers if they have unequal voltage ratios? [5M]
- b) A Three phase 1000 KVA, 6600/1100 V transformer is delta connected on the primary and star connected on the secondary. The Primary resistance/phase is 1.8 ohms and secondary resistance/phase is 0.025 ohms. Determine the efficiency on full load at unity power factor and 0.8pf lagging if the iron loss is 15 KW? [5M]
- OR
- 20 What is Auto Transformer and explain its working. Compare auto transformer with two winding transformer? [10M]