

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:2131005****Date:03-08-2023****Subject Name:Electrical Machines****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

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| Q.1 | (a) Compare squirrel cage & slip ring induction motor. | 03 |
| | (b) Write short note on Ferranti effect. | 04 |
| | (c) What is an autotransformer? Enlist its advantages & disadvantages over 2-winding transformer. Write its applications. | 07 |
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| Q.2 | (a) Explain with necessary diagram sumpner's method of testing transformers. | 07 |
| | (b) What is function of starter for induction motor ?
Enlist starting methods of induction motor. Explain any one method in detail. | 07 |
| | OR | |
| | (b) Explain in detail Armature reaction in DC machine. | 07 |
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| Q.3 | (a) Write applications of Scott connections of transformers. | 03 |
| | (b) Justify : A dedicated single III-phase transformer is more preferable than three I-phase transformers. | 04 |
| | (c) Draw & explain schematic diagram of Thermal Power station. | 07 |
| | OR | |
| Q.3 | (a) Why synchronous motor is not self-starting ? Enlist self starting methods for synchronous motor. Explain any one in detail. | 07 |
| | (b) Define : slip
Draw and Explain torque - slip characteristics of induction motor. | 07 |
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| Q.4 | (a) What is commutation in DC generator ?
Explain in brief methods to improve poor commutation. | 07 |
| | (b) A 15 H.P., 440V, 6-pole, 50-Hz 3-φ induction motor has full load slip of 3%. Calculate
(i) Synchronous speed in rpm
(ii) Full-load speed in rpm
(iii) Frequency of rotor current at full load.
Motor speed in rpm, when slip is 1% | 07 |
| | OR | |
| Q.4 | (a) Draw & explain 3 – point starter for D.C. Shunt motor. | 07 |
| | (b) Define power factor. Enlist reasons for poor power factor.
Explain various power factor improvement methods in brief. | 07 |
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| Q.5 | (a) Draw & explain schematic diagram of Nuclear Power station.
Write precautions required to take care for disposal of nuclear waste. | 07 |
| | (b) Define voltage regulation of alternator. Explain Synchronous impedance method for finding regulation in alternator. | 07 |
| | OR | |
| Q.5 | (a) Draw & explain characteristics of DC Shunt generator. | 07 |
| | (b) Explain open circuit & short circuit tests on I-phase transformer. | 07 |
