GUJARAT TECHNOLOGICAL UNIVERSITY

DI -5 SEMESTER – OLD PAPER – W23 TO S25 – QUESTION BANK(English)

Subject Name & Code:

Special Electrical Machine- 4350906

Unit I - Special Transformer Types

Repeated Questions:

1. **Explain the working of Potential Transformer (PT) and Current Transformer (CT).**
    - **Appeared in:** S25 (Q1c OR, 07 marks), W23 (Q2a OR, 07 marks), SUM24 (Q1c OR, 07 marks)
2. **Distinguish between Potential Transformer and Current Transformer.**
    - **Appeared in:** S25 (Q1b, 04 marks), W24 (Q1d/e/f, 07 marks)
3. **Explain Pulse Transformer.**
    - **Appeared in:** S25 (Q1c OR, 07 marks), SUM24 (Q1c OR, 07 marks)
4. **Explain with sketches Star-delta and Delta-star diagram of a power transformer.**
    - **Appeared in:** SUM24 (Q1b, 04 marks), W23 (Q2a, 03 marks)
5. **Explain Audio Transformer.**
    - **Appeared in:** S25 (Q1c, 07 marks), W23 (Q2c, 07 marks)

Other Important Questions:

1. The secondary of a Potential Transformer (PT) is not short-circuited. Explain.
    - S25 (Q1a, 03 marks)
2. Explain Constant Voltage Transformer (CVT).
    - W23 (Q1a, 03 marks), W24 (Q1c, 07 marks)
3. Describe features of a welding transformer.
    - SUM24 (Q1a, 03 marks)
4. Explain Isolation Transformer.
    - W24 (Q1a, 03 marks)
5. Compare and distinguish audio transformer, isolation transformer and microphone transformer.
    - SUM24 (Q1c, 07 marks)

6. Draw any four connections of a power transformer. (e.g., Yy0, DZ0, Dd6, Dz6)
    - W23 (Q1b, 04 marks), W24 (Q1b, 04 marks)
7. Define Instrument Transformer and write its types.
    - W23 (Q2a OR, 03 marks)
8. Explain the working of Constant Current Transformer (CCT).
    - W24 (Q1c, 07 marks)

Unit II - Special Induction Machines

Repeated Questions:

1. **Explain the working of Wound Rotor Induction Generator.**
    - **Appeared in:** S25 (Q2c OR, 07 marks), W23 (Q2b, 04 marks), SUM24 (Q2b, 04 marks)
2. **Explain the working of Doubly Fed Induction Generator (DFIG).**
    - **Appeared in:** S25 (Q2c, 07 marks), W24 (Q1l, 03 marks), SUM24 (Q2c, 07 marks)
3. **Explain the working principle of dual winding squirrel cage induction generator.**
    - **Appeared in:** W23 (Q1c, 07 marks), SUM24 (Q2c OR, 07 marks)
4. **Explain the working of Linear Induction Motor.**
    - **Appeared in:** S25 (Q2a OR, 03 marks), W24 (Q1j/k, 03 marks)

Other Important Questions:

1. Explain crawling and cogging in induction machines.
    - W24 (Q1h, 03 marks)
2. Explain the maintenance procedure of DFIG.
    - S25 (Q2b, 04 marks)
3. Explain the torque-speed characteristics of DFIG.
    - SUM24 (Q2b OR, 04 marks)
4. List applications of Linear Induction Motor.
    - S25 (Q2a OR, 03 marks)
5. Define Soft Starter and explain its need.
    - S25 (Q2b OR, 04 marks), W24 (Q1g, 03 marks)

Unit III - Special Synchronous Machines

Repeated Questions:

1. **Explain the construction / working of Permanent Magnet Synchronous Generator (PMSG).**
    - **Appeared in:** S25 (Q3a, 03 marks), W23 (Q3a, 03 marks), SUM24 (Q3a OR, 03 marks), W24 (Q1s, 03 marks)
2. **State the advantages and disadvantages of PMSG over Wound Rotor Synchronous Generator (WRSG).**
    - **Appeared in:** S25 (Q3b, 04 marks), W23 (Q3b, 04 marks)
3. **Explain the working of Wound Rotor Synchronous Generator (WRSG).**
    - **Appeared in:** S25 (Q3b OR, 04 marks), W23 (Q3b OR, 04 marks), W24 (Q5, 07 marks)
4. **Explain the use of PMSG / WRSG for (small/large) direct drive wind turbines.**
    - **Appeared in:** S25 (Q3c, 07 marks), W23 (Q3c OR, 07 marks), W24 (Q4, 04 marks)

Other Important Questions:

1. Write the maintenance procedure for PMSG.
    - S25 (Q3a OR, 03 marks), SUM24 (Q3a, 03 marks)
2. Explain the construction of WRSG.
    - S25 (Q3b OR, 04 marks)
3. Distinguish between WRSG and PMSG.
    - SUM24 (Q4a OR, 03 marks)
4. Explain the working of Wound Rotor Synchronous Generator for renewable energy application.
    - W23 (Q3c, 07 marks), S25 (Q3c OR, 07 marks)
5. Explain the working principle of PMSG used in all aspects of the world / with large wind turbines.
    - SUM24 (Q3c, 07 marks), SUM24 (Q3a OR, 03 marks)

Unit IV - Fractional Horse Power Motors

Repeated Questions:

1. **Explain the working of Reluctance Motor.**
   - **Appeared in:** S25 (Q4a, 03 marks), W23 (Q4a OR, 03 marks), SUM24 (Q4a, 03 marks)
2. **Explain the working of Single-Phase Hysteresis Motor.**
   - **Appeared in:** W23 (Q4a, 03 marks), S25 (Q4a OR, 03 marks)
3. **Explain Permanent Magnet Motor with a neat diagram.**
   - **Appeared in:** W23 (Q4c, 07 marks), S25 (Q4c, 07 marks)
4. **Explain the working of Switch Reluctance Motor (SRM) with a neat diagram.**
   - **Appeared in:** S25 (Q4b OR, 04 marks), W23 (Q4b OR, 04 marks)
5. **Derive an equation for voltage for Switch Reluctance Motor.**
   - **Appeared in:** S25 (Q4c OR, 07 marks), W23 (Q4c OR, 07 marks)

Other Important Questions:

1. Write the maintenance procedure for Reluctance Motor.
   - S25 (Q4b, 04 marks)
2. Differentiate between the working principles of Reluctance Motor and Switched Reluctance Motor (SRM).
   - SUM24 (Q4c, 07 marks)
3. Explain the working principle and construction of Hysteresis Motor and Reluctance Motor.
   - SUM24 (Q4c OR, 07 marks)
4. List applications of Hysteresis Motor.
   - SUM24 (Q4b, 04 marks)
5. List applications of Reluctance Motor.
   - SUM24 (Q4b OR, 04 marks)
6. Explain the construction of any one FHP Motor.
   - SUM24 (Q3b, 04 marks)
7. Explain the working of Single-Phase Reluctance Motor.
   - W23 (Q4b, 04 marks)
8. Explain Repulsion Motor.
   - S25 (Q5c OR, 07 marks), W24 (Q8, 07 marks)
9. Explain the maintenance procedure of Repulsion Motor.
   - SUM24 (Q2a OR, 03 marks)
10. List applications of Repulsion Motor.
    - SUM24 (Q5a OR, 03 marks)

Unit V - Special Machines

Repeated Questions:

1. **Explain Synchro with a neat diagram.**
   - **Appeared in:** S25 (Q5c OR, 07 marks), W23 (Q5c, 07 marks), W24 (Q7, 07 marks)
2. **Explain the working of Stepper Motor with a neat diagram.**
   - **Appeared in:** S25 (Q5c, 07 marks), W23 (Q5c OR, 07 marks), W24 (Q10/11, 07 marks)
3. **Explain the working of Resolver Control Transmitter.**
   - **Appeared in:** W23 (Q5a, 03 marks), S25 (Q5b OR, 04 marks)
4. **Define: Detent Torque and Holding Torque.**
   - **Appeared in:** S25 (Q5a OR, 03 marks), W23 (Q5a OR, 03 marks)
5. **Compare conventional DC motor and BLDC motor.**
   - **Appeared in:** W23 (Q5b, 04 marks)

Other Important Questions:

1. Explain the working principle of Stepper Motor.
   - W23 (Q5b OR, 04 marks)
2. List the types of Stepper Motors and explain their principles.
   - SUM24 (Q5c OR, 07 marks), S25 (Q5a, 03 marks)
3. Write the difference between Resolver and Synchro.
   - S25 (Q5b, 04 marks), W24 (Q9, 07 marks)
4. List applications of Resolvers.
   - SUM24 (Q2a, 03 marks)
5. Explain the working principle of Resolvers.
   - SUM24 (Q5b, 04 marks)
6. List applications of Servo Motor.
   - SUM24 (Q5a, 03 marks)
7. Explain the working principle of a Servomotor.
   - SUM24 (Q5b OR, 04 marks)
8. Explain the working of Repulsion Motor with a neat diagram.
   - S25 (Q5c OR, 07 marks)

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