Syllabus for written test to the post of Junior Engineer (Trainee-Electrical)
Chhattisgarh State Power Company Limited

Section -A -20 marks - (20 multiple choice type questions of each 1 mark)

General Knowledge

- Current events — National & International
- Constitution of India, Political system and Indian Administrative system
- Knowledge of Chhattisgarh, geographical location, natural resources, industries, education, administrative structure, history & culture of Chhattisgarh, ancient history, freedom struggle, major archaeological tourist centers of the state.

2. Reasoning and arithmetic

- Coding — Decoding
- Number series
- Non-verbal series
- Directions
- Decision making
- Alphabet series
- Clocks & calendars
- Number ranking
- Cube & dice
- Mirror images
- Blood relations
- Arithmetical reasoning
- Embedded figures
- Arithmetic - multiplication, division, addition, subtraction etc.

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Section –B-80 marks - (80 multiple choice type questions of each 1 mark)

1. Basic Electrical Engineering:-
    - D.C. circuit - Ohm's law.
    - Resistance and Resistivity.
    - Kirchhoff's law.
    - Series and Parallel combination of Resistance.

2. Electromagnetism
    - Emf due to electric current in conductor,
    - Magnetic field due to a coil,
    - Magnetic field due to solenoid,
    - Force on a current carrying conductor,
    - Fleming left hand rule.
    - Electromagnetic Induction,
    - Faraday's law of Electro-magnetic Induction,
    - Fleming right hand rule,
    - Self induction,
    - Mutual induction,
    - Alternating voltage and current,
    - Three phase circuit.

3. Transformer
    - Principle of operation of Transformer,
    - Transformer Ratio,
    - Transformer on load,
    - Effect of core losses, Effect of magnetization,
    - Eddy current loss, Hysteresis loss,
    - Efficiency of a Transformer.

4. Introduction to A.C. machines
    - Overview of A.C. machines
    - Difference between A.C. and D.C. machines.

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5. Basic Feature of A.C. Machines
    - Parts of A.C. machines & their Functions.
    - Materials for Various parts.
    - Stator & rotor windings.

6. Alternators.
    - Types of Alternators.
    - Principle & EMF equation.
    - Winding factor & Its effect induced EMF.
    - Effect of Speed and excitation on induced EMF.
    - Different excitation systems.
    - Excitation system used in modern alternators.
    - Concept of leakage, armature & synchronous reactance.
    - Principle of working of brushless alternators.
    - Applications.

7. A.C. Motors.
    - Types of A.C. motors.
    - Stator & rotor parts, Function, Windings.
    - Concept of rotating magnetic fields.
    - Stator and Rotor current equations.
    - Effect of frequency on slip.
    - Torque equation.
    - Condition for maximum torque.
    - Circle diagram.
    - Necessity of Induction motors starters and different types.
    - Different types of Induction motors.

8. HVDC/HVAC system.
    - Merits & Demerits.
    - Types of D.C. links
    - Controlled Rectification & Filters.
    - Reactive Power requirements.
    - Controlled characteristics.

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9. Inverters.

- Need of Inverter.
- Inverter circuits using SCR in series and parallel mode.
- Circle diagram of emergency tube light.

10. Converters.

- Need of Converter, Types of Converters (DC to DC and AC to AC).
- Block diagram of Chopper.
- Circuit diagrams of Chopper using switching transmission and SCRs.
- Need of Commutation, methods.
- Single phases and three phase cyclo converters.

11. Regulated Power Supply.

- Need of regulation
- Zener regulated DC power supply and its limitations.
- Working of Shunt and Series regulated power supply using transistor.
- IC regulated Power supplies (Circuit Diagram).
- Block diagram of (SMPS) Switch mode power supply.
- AC stabilizer using tap changer.
- Block diagram of Servo stabilizer.

12. Speed Control of Motors

- Advantage of Speed control.
- Separately excited DC motor single and three phases controlled rectifiers.
- Method of Speed regulation, fields failure protection, armature current limiter (Block diagram)
- Dual rectifier for reversal of rotations
- Speed control by chopper (Block diagram)
- Circuit diagrams of speed control of single phase and three phase induction motor (Slip ring)

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