

Plan of Written Examination

All the aspirants are informed as under with respect to the written test to be conducted for the recruitment for the post of Junior Engineer (Electrical) in (Advt No. 10 of 2023) :-

1. The Exam will be conducted in MCQ (Multiple Choice Questions) format. OMR sheet will be used for answering the questions.
2. The Exam would be of 2 hours duration.
3. The Exam will consist of two parts (Part A and Part B) as follows:-

Part	Topic	No. of Questions	Marks (Each Question carries 1 mark)	Type of Questions
A	Questions from General Knowledge and Current Affairs, Punjab History and Culture, Logical Reasoning and Mental ability, Punjabi, English, ICT, (Annexure-1)	40	40	MCQs (Multiple Choice Questions)
B	Questions from the Subject (Annexure-2)	80	80	MCQs (Multiple Choice Questions)
Total		120	120	

4. **There will be negative marking. Each question carries 1 mark. For every wrong answer, 1/4th mark i.e. 0.25 mark would be deducted. The question(s) not attempted will receive no credit or discredit.**
5. **Tentative syllabus for the written examination for the recruitment of Junior Engineer (Electrical) in (Advt No. 10 of 2023) is annexed at Annexure-1 and Annexure-2.**

Annexure - 1

**Part A - General Knowledge, Punjab History and Culture, Logical Reasoning
Mental Ability, Punjabi, English and ICT.**

Sr. No.	Indicative Contents of Syllabus	Weightage (Approx.)
1.	<p>General Knowledge and Current affairs of National and International importance including:</p> <ul style="list-style-type: none"> (i) Polity issues, (ii) Environment issues, (iii) Current Affairs, (iv) Science and Technology, (v) Economic issues, (vi) History of India with special reference to Indian freedom struggle movement. (vii) Sports, (viii) Cinema and Literature. (ix) Geography 	10
2.	<p>Punjab History and Culture:- Physical features of Punjab and its ancient history. Social, religious and economic life in Punjab. Development of Language & literature and Arts in Punjab, Social and culture of Punjab during Afgan/Mughal Rule, Bhakti Movement, Sufism, Teachings/History of Sikh Gurus and Saints in Punjab. Adi Granth, Sikh Rulers, Freedom movements of Punjab.</p>	5
3.	<p>Logical Reasoning & Mental Ability:</p> <ul style="list-style-type: none"> (i) Logical reasoning, analytical and mental ability. (05 Marks) (ii) Basic numerical skills, numbers, magnitudes, percentage, numerical relation appreciation. (03 Marks) (iii) Data analysis, Graphic presentation charts, tables, spreadsheets. (02 Marks) 	10
4.	<p>ਪੰਜਾਬੀ:- ਸ਼ੁੱਧ-ਅਸ਼ੁੱਧ, ਸ਼ਬਦਜੋੜ, ਅਗੇਤਰ ਅਤੇ ਪਿਛੇਤਰ, ਸਮਾਨਾਰਥਕ/ਵਿਰੋਧੀਸ਼ਬਦ, ਨਾਂਵ, ਪੜਨਾਂਵ ਅਤੇ ਕਿਰਿਆ ਦੀਆਂ ਕਿਸਮਾਂ ਤੇ ਸਹੀ ਵਰਤੋਂ, ਲਿੰਗ ਅਤੇ ਵਚਨ, ਪੰਜਾਬੀ ਅਖਾਣ ਤੇ ਮੁਹਾਵਰੇ, ਅੰਗਰੇਜ਼ੀ ਤੋਂ ਪੰਜਾਬੀ ਅਨੁਵਾਦ ਅਤੇ ਬਹੁਤੇ ਸ਼ਬਦਾਂ ਦੀ ਥਾਂ ਇੱਕ ਸ਼ਬਦ ਆਦਿ।</p>	5
5.	<p>English:- Basic Grammar, Subject and Verb, Adjectives and Adverbs, Synonyms, Antonyms, One Word Substitution, Fill in the Blanks, Correction in Sentences, Idioms and their meanings, Spell Checks, Adjectives, Articles, Prepositions, Direct and Indirect Speech, Active and Passive Voice, Correction in Sentences, etc.</p>	5
6.	<p>ICT:- Basics of computers, Network & Internet, Use of office productivity tools Word, Excel, Spreadsheet & PowerPoint.</p>	5
	Maximum Marks	40

Annexure-2

(Part B)

Subject Syllabus Junior Engineer (Electrical)

Number of Questions - 80

Maximum Marks- 80

Basic concepts :

Concepts of resistance, inductance, capacitance, and various factors affecting them. Concepts of current, voltage, power, energy and their units. Circuit law : Kirchhoff's law, Simple Circuit solution using network theorems. Magnetic Circuit : Concepts of flux, mmf, reluctance, Different kinds of magnetic materials, Magnetic calculations for conductors of different configuration e.g. straight, circular, solenoidal, etc. Electromagnetic induction, self and mutual induction. AC Fundamentals: Instantaneous, peak, R.M.S. and average values of alternating waves, Representation of sinusoidal wave form, simple series and parallel AC Circuits consisting of R.L. and C, Resonance, Tank Circuit. Poly Phase system – star and delta connection, 3 phase power, DC and sinusoidal response of R-L and R-C circuit. Measurement and measuring instruments: Measurement of power (1 phase and 3 phase, both active and re-active) and energy, 2 wattmeter method of 3 phase power measurement. Measurement of frequency and phase angle. Ammeter and voltmeter (both moving coil and moving iron type), extension of range wattmeter, Multimeters, Megger, Energy meter AC Bridges. Use of CRO, Signal Generator, CT, PT and their uses. Earth Fault detection.

Electrical Machines :

(a) D.C. Machine – Construction, Basic Principles of D.C. motors and generators, their characteristics, speed control and starting of D.C. Motors. Method of braking motor, Losses and efficiency of D.C. Machines.

(b) 1 phase and 3 phase transformers – Construction, Principles of operation, equivalent circuit, voltage regulation, O.C. and S.C. Tests, Losses and efficiency. Effect of voltage, frequency and wave form on losses. Parallel operation of 1 phase / 3 phase transformers. Auto transformers.

(c) 3 phase induction motors, rotating magnetic field, principle of operation, equivalent circuit, torque-speed characteristics, starting and speed control of 3 phase induction motors. Methods of braking, effect of voltage and frequency variation on torque speed characteristics. Fractional Kilowatt Motors and Single Phase Induction Motors: Characteristics and applications. Synchronous Machines

- Generation of 3-phase e.m.f. armature reaction, voltage regulation, parallel operation of two alternators, synchronizing, control of active and reactive power. Starting and applications of synchronous motors.

Generation, Transmission and Distribution –

Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, inter-connection of power stations. Power factor improvement, various types of tariffs, types of faults, short circuit current for symmetrical faults.

Switchgears – rating of circuit breakers, Principles of arc extinction by oil and air, H.R.C. Fuses, Protection against earth leakage / over current, etc. Buchholz relay, Merz-Price system of protection of generators & transformers, protection of feeders and bus bars. Lightning arresters, various transmission and distribution system, comparison of conductor materials, efficiency of different system. Cable – Different type of cables, cable rating and derating factor.

Estimation and costing :

Estimation of lighting scheme, electric installation of machines and relevant IE rules. Earthing practices and IE Rules. Utilization of Electrical Energy : Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors.

Electronics :

Working of various electronic devices e.g. P N Junction diodes, Transistors (NPN and PNP type), BJT and JFET. Simple circuits using these devices. Industrial and Digital Electronics and PLCM