

ADVERTISEMENT FOR RECRUITMENT OF EXECUTIVES IN OMC

No. 31 /OMC

Date: 31.07.2019

The OMC, a Gold category and largest State PSU in Mining Sector in the Country, undertakes exploration, mining and trading of iron, chrome & bauxite ores. Inspired by the vision to emerge as the market leader and to play a catalytic role in the growth of industrialization, OMC caters to the requirements of mineral based industries. It has attained annual turnover of Rs.4053 Crores during the Financial Year 2018-19.

The Corporation is looking for dynamic & competent professionals to be inducted as Dy. Managers in different disciplines as under:

1. VACANCY :-

Sl. No.	Name of the Post & Grade	Scale of Pay	Category of Posts				Total posts
			SC	ST	SEBC	UR	
1	Dy. Manager (Min.), E-2 grade	Rs.67,700/- to 2,08,700/-	02	04	02	04	12
2	Dy. Manager (Mech.), E-2 grade	Rs.67,700/- to 2,08,700/-	01	0	0	02 (01-W)	03
3	Dy. Manager (Electrical), E-2 grade	Rs.67,700/- to 2,08,700/-	01	01	01	03 (01-W)	06
Total							21

Interested candidates fulfilling the eligibility criteria for respective posts may apply through on-line process of application available in OMC Website www.omcltd.in from 10.00AM of 3rd August 2019 till 11.59 PM of 23rd August, 2019 .

The OMC Management reserves the right to cancel, amend or alter the above advertisement without assigning any reason thereof.

DIRECTOR (PERSONNEL)
THE ODISHA MINING CORPORATION LTD.
(A GOLD CATEGORY STATE PSU)
OMC House, Post Box No. 34,
Bhubaneswar-751001
Website: www.omcltd.in

2. ELIGIBILITY CRITERIA:-

SL No.	Name of the Posts	Basic Qualification	Maximum Age as on 31.07.2019
1	Dy. Manager (Min.), E-2 grade	Diploma in Mining Engg. with 1 st Class MMCC or B.E./B.Tech in Mining Engg. with or without 2 nd Class MMCC	Not below 21 years and above 32 years.
2	Dy. Manager (Mech.), E-2 grade	BE/B. Tech. in Mechanical Engineering from recognized University or Institute approved by AICTE	Not below 21 years and above 32 years.
3	Dy. Manager (Electrical.), E-2 grade	BE/B. Tech. in Electrical Engineering from recognized University or Institute approved by AICTE	Not below 21 years and above 32 years.

Note:-

- The 1st/2nd Class MMCC as described under basic qualification above for the post of Dy. Manager (Mining) in E-2 grade must have been issued by DGMS under MMR, 1961.
- **Equivalent Qualification, Qualification obtained through Correspondence Courses shall not be considered.** However the above prescribed qualification acquired through AMIE (A & B) or correspondence mode from any recognized University/ Institute approved by AICTE/UGC shall only be allowed in respect of the Departmental candidates, who are already in OMC regular Service as on 01.10.2012.
- Upper age limit in case of SC/ST/SEBC/Women/ PWD/Sports Person/ Ex-Servicemen shall be relaxed as per norms of Govt. Similarly, upper age limit in case of departmental candidates fulfilling the eligibility criteria shall be relaxed up to maximum 10 years.

3. HOW TO APPLY:-

I.	Candidates should have a valid personal e-mail ID and mobile number. It should be kept active during the entire recruitment process. Registration number, password, and all other important communication will be sent on the same registered e-mail ID (please ensure that email sent to this mailbox is not redirected to your junk / spam folder).
II.	Candidates should take utmost care to furnish the correct details while filling in the on-line application. YOU CAN EDIT THE INFORMATION BEFORE SUBMISSION OF STEP-I and STEP-II. Once the form is submitted, it can't be edited.
III.	The step by step process for submitting the application form is given below: Step-A: Registration of Personal Details, and Contact details. Login Id and password will be sent to you through e-mail on registered e-Mail Id. Step-B: Please log out and re-log in to go to the Application Form. Fill up the Eligibility Details, Personal Details, Qualification Details, Upload relevant documents and submit Fee online via SBI MOPS (if applicable) through net banking/debit cards/credit cards/wallets.

IV.	Application once submitted cannot be withdrawn and fee once paid will not be refunded in any case, neither shall be held reserved for any other recruitment nor selection process in future.
STEP-I Registration	
a.	The candidates agreeing to the terms & conditions may proceed further by clicking “I agree” check box given below and press the “Start” button.
b.	The candidate should fill up all the desired information i.e. Personal Details, Contact Details, etc. correctly.
c.	On completion of Step-I registration, the candidate will receive a message in the registered e-mail id conveying his/her login ID and password.
d.	The candidate has to log-out and log in again in order to fill up other details in application form.
STEP-II Completion of Application form	
e.	After registration, candidate has to login and complete other details in application form like Personal Details, Qualification Details, and Declaration etc.
f.	Instructions regarding scanning of Photograph, Signature and Certificates: Candidates should upload the scanned (digital) image of their photograph and signature as per the process given below. The applicant should note that only jpg/jpeg format is acceptable: <ul style="list-style-type: none"> i. Photograph Image: <ul style="list-style-type: none"> • Photograph must be a recent passport size colour picture on light background. • The size of the scanned image should be between 50kb -100kb in jpg/ jpeg format only. ii. Signature image: <ul style="list-style-type: none"> • The applicant has to sign on white paper with Black/Blue ball point pen. • Size of file should be between 50kb – 100kb in jpg/jpeg format only. iii. Certificate image: <ul style="list-style-type: none"> • Please scan the relevant Certificates. • Each Certificate in JPG/JPEG/PDF format only and Size of file should be between 50kb – 1000kb.
g.	Once the application is submitted, candidates will automatically be redirected to SBI payment gateway to deposit the fee of INR 1000/- + Bank charges (if applicable) through Debit Card/Credit Card/Net Banking/Wallets. Candidate may generate payment acknowledge slip for future reference.
h.	Guidelines for remittance of fee are as under: <ul style="list-style-type: none"> • Post submission, the candidate will be re-directed to Payment gateway to make the online payment of application fees. • Kindly verify the details and make the payment for application fees via the different payment modes. • Post successful payment of application fees, candidate will be redirected to his/her application form. • Candidates are advised to keep with them the copy of the e-receipt as a token of remittance of fee for future reference.
*	For technical queries/ clarifications relating to the filling up of ONLINE APPLICATION, please feel free to contact the helpdesk at Email: omclhelpdesk@gmail.com or Phone No: 18002664318

4. RESERVATION:-

Sl. No	Name of the Post	Category of Posts				Total Posts to be filled up
		SC	ST	SEBC	UR	
1	Dy. Manager (Min.), E-2 grade	2	4	2	4	12
2	Dy. Manager (Mech.), E-2 grade	1	0	0	2 (1-W)	3
3	Dy. Manager (Electrical.), E-2 grade	1	1	1	3 (1-W)	6
Total						21

- If the vacancies reserved for women categories remain unfilled due to non-availability or availability of insufficient number of eligible women candidates belonging to the relevant category, the unfilled vacancies shall be filled up by eligible male candidates of the same category.
- Reservation for Ex-Servicemen / Person with Disabilities (PWD) / Sports Person shall be considered as per guidelines of State Government of Odisha.
- Ex-Servicemen are required to attach copy of Discharge Certificate issued by the Competent Authority.
- Candidates belonging to PWD, Ex-Servicemen and Sports Person shall be adjusted against the categories to which they belong.
- PWD Candidates (**who are partially deaf and with suitable hearing aid & having good speech only are allowed**) whose disability is 40% or above required to attach disability certificate indicating % of disability and type of disability issued by the concerned Medical Board for consideration as per Rules. Further the above allowed PWD candidates should meet all the following standards of physical requirement to perform work by:
 - Manipulating with Fingers- F
 - Pushing & Pulling- PP
 - Lifting- L
 - Kneeling & Crouching- KC
 - Bending - B
 - Sitting- S
 - Standing- ST
 - Walking- W
 - Seeing- SE
 - Hearing/ Speaking- H
 - Reading & Writing- R & W

- Women candidates belonging to SC / ST/ SEBC are required to submit Caste Certificate by birth showing “daughter of”. Caste Certificates obtained by virtue of marriage (i.e. showing wife of”) is not acceptable.
- SEBC Candidates shall submit the SEBC Certificate issued on or after **01.08.2018** by the Competent Authority.

5. SELECTION METHODOLOGY:-

- Selection for the above posts will be made in two stages.

1. STAGE ONE: (Computer Based Test)

- Eligible candidates will be called for Computer Based Test (CBT), comprising 120 (One Hundred Twenty) number of Multiple Choice Questions (MCQs) as under:

Subject Knowledge	80marks
Quantitative Aptitude	10marks
General Knowledge	10marks
Reasoning	10marks
English Knowledge	10Marks
Total	120marks

- The CBT will be of 2 (Two) hours duration.
- The Syllabus of Subject Knowledge, Quantitative Aptitude, General Knowledge, Reasoning & English Knowledge for the posts of Dy. Manager (Mining), Dy. Manager (Mechanical) & Dy. Manager (Electrical) in E-2 grade are described below at **Annexure- I & II**.
- **For every correct answer, one mark shall be awarded. For every wrong answer attempted by the candidates, negative marking of ¼ marks (i.e., 0.25 marks) will be deducted. No marks will be awarded/deducted for un-attempted questions.**
- The candidates in UR/SEBC category and SC/ST category need to secure 50% & 45% marks respectively in the CBT in order to qualify for shortlisting to be done at Stage two.

2. STAGE TWO: (Document Verification & Personal Interview)

- The candidate who qualify the CBT shall be shortlisted (in the descending order of securing marks in CBT) to be called for Personal Interview for each category of the advertised posts in the ratio as under:
 - 1: 7 for single vacancy
 - 1: 5 for more than 1 but less than 10 vacancies
 - 1:3 for more than 10 vacancies

- ii. Prior to the Personal Interview, suitable nos. of candidate (who qualify in the CBT in the descending order from the top of securing marks in the CBT) to be called for Document Verification. The nos. / ratio of candidates to be called for Document Verification shall be decided by the Management at that particular time depending upon the circumstances, so that required nos. of candidates can be shortlisted as per the ratio (Sl. No.2 (i) above) finally to be called for Personal Interview.
- iii. **The candidates to be called for Document Verification will have to produce original mark-sheets, certificates, documents from (HSC/ 10th onwards) towards proof of age, caste, qualification etc.**
- iv. The Candidature of the candidates, not producing the required original documents at the time of document verification, shall be cancelled/ rejected.
- v. The Candidates already employed in Govt./Semi-Govt./Central PSU/State PSU shall submit '**No Objection Certificate**' issued by their present employer at the stage of document verification.
- vi. The candidates shortlisted finally (in the descending order of marks secured in qualifying CBT) after due document verification shall be called for the Personal Interview in the ratio as mentioned at Sl. No.2 (i) above.
- vii. The Departmental candidates meeting the eligibility criteria and qualifying in the CBT shall be called for Personal Interview over & above the finally shortlisted outside candidates.
- viii. The short-listed candidates shall be called for Personal Interview considering the vacancies, post based percentage of reservation as well as requirement.
- ix. Shortlisted candidates having Unrestricted Competency (Under MMR, 1961) shall be given preference for the post of Dy. Manager (Mining) in E-2 grade while assessing the performance/merit/suitability of a candidate during the Personal Interview.
- x. Merely qualifying in the CBT does not guarantee a candidate eligible to be shortlisted for appearing in the Personal Interview. The qualifying (in CBT) candidates shall only be shortlisted for Personal Interview in the descending order (marks obtained in the CBT) in the ratio as above subject to the Document Verification. The candidates who are not called for Personal Interview shall not have any claim on this.
- xi. Filling-up of vacancies is solely at the discretion of the Management based on suitability of candidates & hence, no claim shall arise for appointment, if vacancies are not filled up due to un-suitability / insufficient number of candidates.

6. GENERAL CONDITION:-

- The candidates who are waiting for final result of prescribed base educational qualification for the posts of Dy. Manager (Mining), Dy. Manager (Mechanical) & Dy. Manager (Electrical) in E-2 grade **are not eligible to apply.**
- The Executives & Non- Executives of OMC, having requisite prescribed qualification acquired through regular course(*) applying for the post of Dy. Manager (Min.)/ Dy. Manager (Mech.)/Dy. Manager (Elect.) and belonging to the same cadre of Dy. Manager (Min.)/ Dy. Manager (Mech.)/Dy. Manager (Elect.), shall be considered as Departmental Candidates. The upper age limit for them shall be relaxed up to 10 years.
(* Prescribed qualification acquired through AMIE (A&B)/ Correspondence course shall only be considered in case of Executives & Non-executives of the same cadre, who are already in OMC regular service as on 01.10.2012.
- The candidate is required to pay a non-refundable and non-adjustable amount of **Rs.1000/-** (Rupees One thousand) only for each post towards Application fee in **Online Mode**.(As mentioned at **How to Apply Section**)
- **The candidates are advised to submit only one Application for each post. In case a candidate submits Multiple Applications against a particular category of post, then the Latest Application submitted by the candidate shall be considered. In such a case of Multiple Applications, the applicant has to submit the application fee against his/her latest Application. No request for adjustment of application fee for such latest application against the fee paid for the earlier applications, if any, shall be allowed.**
- Candidates belonging to SC/ST of Odisha, eligible PWD candidates and Departmental candidates are exempted from payment of examination fee.
- Unemployed SC/ST candidates of Odisha called for Personal Interview will be allowed to reimburse to & fro journey expenses as per State Govt. norms.
- Candidates are requested to visit Corporation website. www.omcltd.in ➤**Recruitment Portal** only at regular intervals for any notification, news, updates, results etc. relating to recruitment.
- The decision of OMC Management will be final & binding on candidates in matters relating to eligibility, acceptance or rejection of the application, selection of candidate, cancellation of the recruitment process, etc. No enquiry/correspondence will be entertained in this regard.

- At any stage of recruitment process, if it is found that the candidate has furnished false or incorrect information, then the candidature /appointment of the candidate shall liable to be cancelled.
- Canvassing in any form shall be viewed adversely & shall lead to disqualification.
- The selected candidates shall produce the required documents at the time of joining at their place of posting as per provisions of OMC R&P Rules for Executives 2012 (visit Corporation website www.omcltd.in)
- Any dispute arising out of this connection will be subject to jurisdiction of appropriate Courts in Bhubaneswar only.
- Interested eligible candidates may visit OMC Website www.omcltd.in and apply online within the scheduled dates as prescribed in the “Instruction Sheet” as well as in this advertisement.

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SYLLABUS FOR DY. MANAGER (MINING)

1. MINE DEVELOPMENT AND SURVEYING

- **Mine Development:** Methods of access to deposits; Underground drivages; Drilling methods and machines; Explosives, blasting devices and practices.
- **Mine Surveying:** Levels and leveling, theodolite, tacheometry, triangulation; Contouring; Errors and adjustments; Correlation; Underground surveying; Curves;
Photogrammetry; Field astronomy; EDM and Total Station; Introductory GPS.

2. GEOMECHANICS AND GROUND CONTROL

- **Engineering Mechanics:** Equivalent force systems; Equations of equilibrium; Two dimensional frames and trusses; Free body diagrams; Friction forces; Particle kinematics and dynamics; Beam analysis.
- **Geomechanics:** Geo-technical properties of rocks; Rock mass classification; Instrumentation and stress measurement techniques; Theories of rock failure; Ground vibrations; Stress distribution around mine openings; Subsidence; Rock bursts and coal bumps; Slope stability.
- **Ground Control:** Design of pillars; Roof supporting systems; Mine filling.

3. MINING METHODS AND MACHINERY

- **Mining Methods:** Surface mining: layout, development, loading, transportation and mechanization, continuous surface mining systems; Slope Stability; Underground Coal Mining: bord and pillar systems, room and pillar mining, longwall mining, thick seam mining methods; highwall mining; Underground metal mining: open, supported and caved stoping methods, stope mechanization, ore handling systems.
- **Mining Machinery:** Generation and transmission of mechanical, hydraulic and pneumatic power; Materials handling: haulages, conveyors, face and development machinery, hoisting systems, pumps, crushers.

4. SURFACE ENVIRONMENT, MINE VENTILATION, AND UNDERGROUND HAZARDS

- **Surface Environment:** Air, water and soil pollution: Standards of quality, causes and dispersion of contamination, and control; Noise; Land reclamation.
- **Mine Ventilation:** Underground atmosphere; Heat load sources and thermal environment, air cooling; Mechanics of air flow, distribution, natural and mechanical ventilation; Mine fans and their usage; Auxiliary ventilation; Ventilation planning; Ventilation networks.
- **Subsurface Hazards:** Mine Gases. Underground hazards from fires, explosions, dust and inundation; Rescue apparatus and practices; Safety in mines; Accident data analysis; Mine lighting; Mine legislation; Occupational safety.

5. MINE ECONOMICS, MINE PLANNING, SYSTEMS ENGINEERING

- **Mine Economics:** Mineral resource classification; discounted cash flow analysis; Mine valuation; Mine investment analysis; Mineral taxation.
- **Mine Planning:** Sampling methods, practices and interpretation; Reserve estimation techniques: Basics of geostatistics and quality control; Optimization of facility location; Work-study.
- **Systems Engineering:** Concepts of reliability; Reliability of simple systems; Maintainability and availability; Linear programming, transportation and assignment problems; Network analysis; Inventory models; Queuing theory; Basics of simulation.

6. MINE LEGISLATION:

- **Safety, Welfare & health related statute:** The Mines Act, 1952; Mines Rules, 1955; Mines Rescue Rules, 1985; provisions of Indian Electricity Rules, 1956 applicable to mines; Mine Vocational Training Rules, 1966.
- **Statute pertaining to Mineral Concession & Conservation:** The Mines and Minerals (Development and Regulation Act, 1957, Minerals (other than Atomic Hydro Carbonic Energy Minerals) Concession Rules 2016, Mineral Conservation and Development Rules 2017.

7. GEOLOGY :

- Rock forming minerals, rocks and their general characteristics, Indian Stratigraphy, Structural Geology, types of folds & faults, Dip, Strike, Ore deposits.

SYLLABUS FOR DY. MANAGER (MECHANICAL)

1. APPLIED MECHANICS AND DESIGN:

- **Engineering Mechanics:** Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane Motion; impulse and momentum (linear and angular) and energy formulations, Collisions.
- **Mechanics of Materials:** Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.
- **Theory of Machines:** Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.
- **Vibrations:** Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.
- **Machine Design:** Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

2. FLUID MECHANICS AND THERMAL SCIENCES:

- **Fluid Mechanics:** Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.
- **Heat-Transfer:** Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan-Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.
- **Thermodynamics:** Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.
- **Applications:** Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles. Refrigeration and air-conditioning: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. Turbo machinery: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

3. MATERIALS, MANUFACTURING AND INDUSTRIAL ENGINEERING

- **Engineering Materials:** Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials. Casting, Forming and Joining Processes: Different types of castings, design of patterns, mould and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.
- **Machining and Machine Tool Operations:** Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.
- **Metrology and Inspection:** Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.
- **Computer Integrated Manufacturing:** Basic concepts of CAD/CAM and their integration tools.
- **Production Planning and Control:** Forecasting models, aggregate production planning, scheduling, materials requirement planning.
- **Inventory Control:** Deterministic models; safety stock inventory control systems.
- **Operations Research:** Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

SYLLABUS FOR DY. MANAGER (ELECTRICAL)

1. Electric Circuits:

- Network graph, KCL, KVL, Node and Mesh analysis, Transient response of DC and AC networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in AC circuits.

2. Electromagnetic Fields:

- Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

3. Signals and Systems:

- Representation of continuous and discrete-time signals, Shifting and scaling operations, Linear Time Invariant and Causal systems, Fourier series representation of continuous periodic signals, Sampling theorem, Applications of Fourier Transform, Laplace Transform and Z-Transform.

4. Electrical Machines:

- Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto-transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of DC motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines

5. Power Systems:

- Power generation concepts, AC and DC transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss-Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

6. Control Systems:

- Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

7. Electrical and Electronic Measurements:

- Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

8. Analog and Digital Electronics:

- Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

9. Power Electronics:

- Characteristics of semiconductor power devices: Diode, Thyristor, Triac, GTO, MOSFET, IGBT DC to DC conversion: Buck, Boost and Buck-Boost converters; Single and three phase configuration of uncontrolled rectifiers, Line commutated thyristor based converters Bidirectional AC to DC voltage source converters, Issues of line current harmonics, Power factor, Distortion factor of AC to DC converters, Single phase and three phase inverters, Sinusoidal pulse width modulation.

THE SYLLABUS OF QUANTITATIVE APTITUDE, GENERAL KNOWLEDGE, REASONING & ENGLISH KNOWLEDGE ARE COMMON FOR THE ABOVE POSTS.

- **Verbal Ability (General English)**: Articles, Prepositions, Vocabulary, Reading and Comprehension, Synonyms, Jumbled Sentences
- **Reasoning**: Data Interpretation, Coding and Decoding, Deductive Logic, Inductive Logic, Data Sufficiency, Series Completion, Puzzles, Pattern Completion, etc.
- **Quantitative Aptitude**: Ratio and Proportion, Time and Work, Speed and Distance, Percentages and Averages, Profit, Loss and Discount, Probability, etc.
- **General Knowledge**: Current affairs, World Records, Business, Top officials of big companies, Famous awards and Prizes, Books and Authors, Punch line of companies, History, International Organization, Important Quotations, Social issues, Geography, Sports, Finance, Major Corporate news,
- Science, Entertainment and Politics.