# ANNEXURES

| Sl. No. | Annexure | | Content |
|---|---|---|---|
| 1 | Annexure-I | - | Syllabus of Jr. Engineer (Mechanical) |
| 2 | Annexure-II | - | Syllabus of Jr. Engineer (Electrical) |
| 3 | Annexure-III | - | Syllabus of Jr. Engineer (Civil) |
| 4 | Annexure-IV | - | Syllabus of Jr. Nurse |
| 5 | Annexure-V | - | Syllabus of Jr. Pharmacist |
| 6 | Annexure-VI | - | Syllabus of Electrician-III |
| 7 | Annexure-VII | - | Certificate format for opting own scribe/reader by PwBD candidate with physical limitation |

**ANNEXURE- I**

## SYLLABUS FOR JR. ENGINEER (MECHANICAL)

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. Core Subject** (60 Marks)

1. **Engineering Mechanics:** Static Mechanics, Resolution of Force, Moment, Equilibrium, Friction, Centroid and Moment of Inertia, Dynamics, Simple Machines.
2. **Strength of Material:** Simple Stress & Strain, Thin Cylinder & Spherical Shell under internal pressure, Two dimensional stress systems, Bending moment & shear force, Theory of simple bending, combined direct & bending stresses, Torsion.
3. **Engineering Material:** Engineering materials and their properties, Ferrous Materials and alloys, Iron-Carbon system, Crystal imperfections, Heat Treatment, Non-ferrous alloys, Bearing material, Spring materials, Polymers, Composites and Ceramics, Surface preparation and Industrial painting.
4. **Thermal Engineering I:** Thermodynamics Concepts and terminology, Energy and Work Transfer, Laws of Thermodynamics, Working Substances, Properties of gases, Ideal Gases and real gases, IC engine, Gas power cycle, Fuels and combustions.
5. **Production Technology:** Metal Forming Processes, Welding, Casting, Power Metallurgy, Press Work, Jigs and Fixtures.
6. **Theory of Machine:** Simple mechanism, Friction, Power Transmission, Governors and Flywheel, Balancing of Machine, Vibration of machine parts.
7. **Manufacturing Technology:** Tool Materials, Cutting Tools, Lathe Machine, Shaper, Planning Machine, Milling Machine, Slotter, Grinding, Internal Machining Operations (Drilling, Boring, Broaching), Surface finish, Lapping.
8. **Thermal Engineering II:** Properties of Vapour and Vapour Power Cycles, Steam Generators, Steam Turbines, Gas Power Cycles, Fuels and Combustion, Heat Transfer, Refrigeration Cycles, Air Compressors.
9. **Fluid Mechanics and Hydraulics Machines:** Properties of Fluid, Fluid Pressure and it's measurements, Hydrostatics, Fluid Flow, Flow through pipe, Impact of jets, Hydraulic turbines, Hydraulic Pumps.
10. **Environmental Studies:** Renewable and non-renewable resources, ECO Systems, Biodiversity, Environmental Pollution, Disaster Management, Social Issues and the Environment, Sustainable development, Water conservation, Rain water harvesting.
11. **Machine Design:** Design of Fastening elements, Design of Shafts and Keys, Design of belt drives and pulleys, Design of closed coil helical spring and leaf spring.

**12. Industrial Engineering and Quality Control:** Plant location and Layout, Operations Research, Inventory Control, Plant maintenance, Inspection and Quality Control, Contemporary Quality Management concepts.

**13. Automobile Engineering:** Automobiles Definition, need and classification, Layout of automobile chasis with major components, Transmission system, Braking system, Auto electric system, Suspension System, Cooling and Lubrication, Fuel and Ignition System.

**14. Basic Electrical Technology:** Introduction to Electrical Power supply & transmission, Power Distribution & Utilization, AC & DC supply, Three phase supply, Measuring Instruments, DC Motor, AC Machines (Transformer, AC Motor, Alternator, Synchronous Motor), Industrial applications, Electric heating & welding.

**15. Applied Thermodynamics:** Performance of I.C engine, Air Compressor, Refrigeration & Air Conditioning.

**16. Advance Manufacturing & CAD/CAM:** Non –conventional machining process, Automation, Numerical Control, CAD/CAM and CIM.

**17. Alternate Energy Sources and Management:** Non-conventional renewable energy source and potential of renewable energy source, Pollution aspects of conventional sources of energy, Global warming and Green House effects, Solar radiation, Solar energy collection, Solar energy storage, Solar energy application, Wind energy, Tidal energy, Bio-energy.

**18. Industrial Fluid Power:** Fluid power Fundamental, Pumps, Actuators, Pressure Control, Direction Control Valve, Flow Control Valve, Hydraulic Circuit, Hydraulic Pumps.

**19. Mechanical Measurements and Control:** Introduction to measurement, Linear measurement, Angular measurement, Limits, fits & tolerances, Transducers, Strain measurement, Measurement of Pressure, Temperature measurement.

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English** | (15 Marks) |
| | **Grammar** | |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |

**ANNEXURE- II**

## SYLLABUS FOR JR. ENGINEER (ELECTRICAL)

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. Core Subject** (60 Marks)

1. **Basic concepts**: Concepts of resistance, inductance, capacitance, and various factors affecting them. Concepts of current, voltage, power, energy and their units.

2. **Circuit law**: Kirchhoff's law, Simple Circuit solution using network theorems.

3. **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.

4. **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.

5. **Measurement and measuring instruments**: Measurement of power (1 phase and 3 phases, 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 oil 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.

6. **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.

7. **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.

8. **Generation, Transmission and Distribution**: Different types of power stations, Load factor, diversity factor, demand factor, cost of generation, interconnection 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, gas and air, H.R.C. Fuses,

   Protection against earth leakage/ over current, etc. Buchholtz 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.

9. **Estimation and costing**: Estimation of lighting scheme, electric installation of machines and relevant IE rules, Earthing practices and lE Rules.

10. **Utilization of Electrical Energy**: Illumination, Electric heating, Electric welding, Electroplating, Electric drives and motors.

11. **Basic 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.

12. **Electrical Engineering Materials:** Conducting materials, semi conducting materials, Insulating materials, dielectric materials, materials for special purpose.

13. **Instrumentation And Control:** Sensor & transducer, oscilloscope, measurement on non-electric quantities, control system, servo mechanism, mathematical model of physical system, servo motor, block diagram of control system, stability of control system.

14. **Power Electronic & Drives:** Thyristor, Firing circuit of thyristor, Phase controlled rectifier, inverter, chopper, cycloconverter, power semiconductor devices, thyristor application, AC & DC drives

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English** | (15 Marks) |
| | **Grammar** | |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |

**ANNEXURE- III**

## SYLLABUS FOR JR. ENGINEER (CIVIL)

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. Core Subject** (60 Marks)

### 1. BUILDING MATERIALS AND BUILDING CONSTRUCTION:-

(a) **Building Materials:**

Cement : Components, different types, setting times, strength, Cement Mortar, Ingredients, proportions, water demand, mortars for plastering and masonry.

Concrete: Importance of W/C Ratio, Strength, ingredients including admixtures, workability, testing for strength, non-destructive testing, mix design methods.

Bricks: Types, Indian Standard classification, absorption, saturation factor, strength in masonry. This shall cover the KB Bricks, fly ash Bricks.

(b) **Building construction:** Types of Foundations, Frame structured building, Load bearing Wall, Fly ash brick, Brick masonry, Stone masonry, Floorings, Causes and prevention of cracks in buildings, Damp proofing, Special maintenance of buildings.

**2. ESTIMATING, COSTING AND VALUATION:** Estimate, glossary of technical terms, analysis of rates, methods and unit of measurement, Items of work – earthwork, Brick work (Modular & Traditional bricks), RCC work, Shuttering, Timber work, Painting, Flooring, Plastering, Boundary wall, Brick building, Water Tank, Septic tank, Bar bending schedule, Centre line method, Mid-section formula, Trapezodial formula, Simpson's rule, Cost estimate of Septic tank, flexible pavements, Tube well, isolates and combined footings, Steel Truss, Piles and pile-caps. Valuation – Value and cost, scrap value, salvage value, assessed value, sinking fund, depreciation and obsolescence, methods of valuation.

**3. CONSTRUCTION PLANNING AND MANAGEMENT:** Preliminary estimate, Detailed estimate, Specifications and cost analysis, Bar chart, Linked bar chart, Work-breakdown structures, Activity-on arrow diagrams, Critical path, probabilistic activity durations, Event-based networks, PERT networks: Time-cost study, Resource allocation.

**4. SURVEYING:** Principles of surveying, measurement of distance, chain surveying, working of prismatic compass, compass traversing, bearings, local attraction, plane table surveying, theodolite traversing, adjustment of theodolite, Levelling, Definition of terms used in levelling, contouring, curvature and refraction corrections, temporary and permanent adjustments of dumpy level, methods of contouring, uses of contour map, tachometric survey, curve setting, earth work calculation, advanced surveying equipment.

**5. SOIL MECHANICS:** Origin of soil, phase diagram, Definitions-void ratio, porosity, degree of saturation, water content, specific gravity of soil grains, unit weights, density index and interrelationship of different parameters, Grain size distribution curves and their uses Index properties of soils, Atterberg's limits, ISI soil classification and plasticity chart Permeability of soil, coefficient of permeability, determination of coefficient of permeability, Unconfined and confined aquifers, effective stress, quick sand, consolidation of soils, Principles of consolidation, degree of consolidation, pre-consolidation pressure, normally consolidated soil, e-log p curve, computation of ultimate settlement, Shear strength of soils, direct shear test, Vane shear test, Triaxial shear test Soil compaction, Laboratory compaction test, Maximum dry density and optimum moisture content, earth pressure theories, active and passive earth pressures, Bearing capacity of soils, plate load test, standard penetration test.

**6. WATER RESOURCES AND HYDRAULIC ENGINEERING:**

(a) **Fluid Mechanics**: Fluid Properties, Pressure, Thrust, Buoyancy; Flow Kinematics; Integration of flow equations; Flow measurement; Relative motion; Moment of momentum; Viscosity, Boundary layer and Control, Dimensional Analysis, Flow development, losses in pipe flows, Pipe networks, Flow measuring equipment and structures.

(b) **Open Channel Flow**: Momentum and Energy principles in Open channel flow, Types of flow, Flow sections and properties; Normal flow, Gradually varied flow, Hydraulic jump.

**7. TRANSPORTATION ENGINEERING:**

(a) **Highway Engineering** – cross sectional elements, geometric design, types of pavements, pavement materials – aggregates and bitumen, different tests, Design of flexible and rigid pavements – Water Bound Macadam (WBM) and Wet Mix Macadam (WMM), Gravel Road, Bituminous construction, Rigid pavement joint, pavement maintenance, Highway drainage.

(b) **Traffic Engineering** : Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity, traffic survey, road safety.

## 8. ENVIRONMENTAL ENGINEERING:

(a) **Water Supply Engineering**:- Sources of supply, design of intakes, Estimation of demand; Water quality standards; Primary and secondary treatment, detailing and maintenance of treatment units; Conveyance of treatment units; distribution systems of treated water, leakages and control; Institutional and industrial Water supply.

(b) **Waste Water Engineering**:- Urban rain water disposal; Quantity and characteristics of waste water, Collection of waste water, Primary, Secondary and tertiary treatment of waste water, Sludge disposal, effluent discharge standards, Institutional and industrial sewage management.

(c) **Solid Waste Management**:- Characteristics, Generation, Collection and Transportation, Engineered systems of solid waste management (reuse, recycle, recovery, treatment and disposal), Design and Management of landfills.

## 9. STRUCTURAL ENGINEERING:

(a) **Simple Stresses and Strains**:

Introduction to stresses and strains mechanical properties of materials rigidity, elasticity, plasticity, compressibility, hardness, toughness, stiffness, brittleness, ductility, malleability, creep, fatigue, tenacity durability, types of stresses –tensile, compressive and shear stresses, types of strains: tensile, compressive and shear strains, complimentary shear stress – diagonal tensile / compressive stresses due to shear, elongation and contraction, longitudinal and lateral strains, poison's ratio, volumetric strain, computation of stress, strain, poison's ratio , change in dimensions and volume etc, Hooke's law of elastic constants, derivation of relationship between the elastic constants.

**Application of simple stress and strain in engineering field**:

Behaviour of ductile and brittle materials under direct loads, stress strain curve of a ductile material, limit of proportionality, elastic limit, yield stress, ultimate stress, breaking stress, percentage elongation & percentage reduction in area, significance of percentage elongation and reduction in area of cross section, deformation of prismatic bars due to uni-axial load, deformation of prismatic bars due to its self weight.

**Stresses in beams due to bending** : Bending stress in beams- theory of simple bending assumptions moment of resistance – equation for flexure – flexural stress distribution – curvature of beam – position of n.a. (neutral axis) and centroidal axis – flexural rigidity – significance of section modulus.

**Shear stresses in beams** : Shear stress distribution in beams of rectangular, circular and standard sections, symmetrical about vertical axis.

**Combined direct and bending stresses**: Combination of stresses, combined direct and bending stresses, maximum and minimum stresses in sections, conditions for no tension, limit of eccentricity, middle third/fourth rule, core or kern for square, rectangular and circular sections, chimneys, dams and retaining walls.

**Columns and Struts**: Columns and struts, definition, short and long columns, end conditions, equivalent length, effective length, slenderness ratio, axially loaded short and long column, Euler's theory of long columns, critical load for columns with different end conditions.

**Shear Force and Bending Moment** :

**Types of loads and beams** : Types of loads: Concentrated (or) point load, uniformly distributed load (udl), types of supports: simple support, roller support, hinged support, fixed support, types of reactions: vertical reaction, horizontal reaction, moment reaction, types of beams based on support conditions, calculation of support reactions using equations of static equilibrium.

**Shear force and bending moment in beams**

**Shear Force and Bending Moment** : Signs convention for S.F. and B.M., S.F. and B.M. of general cases of beams with concentrated loads and udl, S.F. and B.M. diagrams for cantilevers, simply supported beams and over hanging beams, position of maximum B.M., point of contraflexure, relation between intensity of load, S.F. and B.M.

**Slope and Deflection**

**Introduction** : Shape and nature of elastic curve (deflection curve); relationship between slope, deflection and curvature (no derivation), importance of slope and deflection.

Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by double integration method, Macaulay's method).

**Indeterminate Beams**

Indeterminacy in beams, principle of consistent deformation/compatibility analysis of propped cantilever, fixed and two span continuous beams by principle of superposition, S.F. and B.M. diagram (point lad and udl covering full span).

**Trusses**

Introduction: Types of trusses, statically determinate and indeterminate trusses, degree of indeterminacy, stable and unstable trusses, advantages of trusses.

Analysis trusses: Analytical method (method of joints, method of section).

(b) **Theory of structures**: Elasticity constants, types of beams – determinate and indeterminate, bending moment and shear force diagrams of simply supported, cantilever and over hanging beams Moment of area and moment of inertia for rectangular & circular sections, bending

moment and shear stress for tee, channel and compound sections, chimneys, dams and retaining walls, eccentric loads, slope deflection of simply supported and cantilever beams, critical load and columns, Torsion of circular section

(c) **Concrete Technology**: Properties, Advantages and uses of concrete, cement aggregates, importance of water quality, water cement ratio, workability, mix design, storage, batching, mixing, placement, compaction, finishing and curing of concrete, quality control of concrete, hot weather and cold weather concreting, repair and maintenance of concrete structures

(d) **Steel Design**: Steel design and construction of steel columns, beams, roof trusses, plate girders.

## 10. GEOTECHNICAL ENGINEERING:

(a) **Soil Mechanics**:- Fundamental definitions and interrelationships; Properties and Classification of soils, Permeability and seepage, Effective stress principles, Shear strength, Consolidation, Compaction, stress distribution in soils.

(b) **Foundation Engineering**:- Type of foundations, Foundation design requirements, Shallow foundations bearing capacity, settlement analysis in sands and clays, Deep foundation- pile types, dynamic and static formulae, load carrying capacity of piles in sands and clays, group action, negative skin friction, Earth pressure theories, effect of water table, layered soils, Stability of slopes, Sub-surface investigations: scope, drilling bore holes, sampling, penetration tests, plate load tests, geophysical tests.

## 11. CONSTRUCTION MANAGEMENT:

- Objectives & functions of Construction Management
- Construction Planning, Construction scheduling by Bar chart, PERT and CPM Techniques
- Construction Site Management such as review of drawings, specification, layout of structures, equipment.
- Construction Organization such as structures, responsibility, function, control authority, Relationship with different functionalities
- Labour Management such as labour category, schedule, wages, incentives etc.
- Equipment Management such as equipment schedule, deployment, maintenance, safety etc.

## 12. QUALITY CONTROL

- Concept of quality in construction
- Quality Standards – during construction, after construction- destructive & non-destructive methods.

**13. MONITORING PROGRESS** with respect to schedule, project over run, physical & financial impact.

**14. SAFETY MANAGEMENT IN CONSTRUCTION:-**

- Safety SOP/ Modalities to be followed for excavation, scaffolding, formwork, fabrication and erection, demolition
- Development of safety consciousness

**15. MS PROJECT:-**

- Project Management -Definition & concept
- Features of Microsoft project
- MS project scheduling for engineering

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English** | (15 Marks) |
| | **Grammar** | |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |

**ANNEXURE- IV**

## SYLLABUS FOR JR. NURSE

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. Core Subject** (60 Marks)

1. **Nursing Art:** Preparation of patient unit, Admission of patient, Observation, Personal hygiene, Nutrition, Comfort major, Elimination, Hot & Cold application, administration of medicine, Injection, Fetal skull and maternal pelvis, Antenatal care, Normal labour, Antepartum Hemorrhage, Gynaecology, Multiple pregnancy, Complication third stage of labour, Abnormal Puerperium, Operating obstetrics.

2. **Anatomy Physiology:** Cardiovascular system, lymphatic system, Nervous system, Endocrine system, Respiratory system, Digestive system, Urinary system, Skin, Immunity, Reproductive system, Muscular system.

3. **Microbiology:** Fungi, Bacteria, Virus, Parasites, Common parasitic diseases- Protozoal & Helminthic.

4. **Medical Surgical Nursing:** Common problems of adult patients, Respiratory nursing, Oncological nursing, Alimentary nursing, Gastrointestinal nursing, Hepatobiliary pancreatic nursing, Orthopedic nursing, Neurological nursing, Endocrinological nursing, Urological nursing, Renal Nursing, Dermatological nursing, Ophthalmic nursing, Cardiovascular resuscitation.

5. **Mental Health:** Principles and concept, Nurse patient relations, Schizophrenia Management, Psychotic disorder, Management of Mood disorder, Neurotic/ Stress related, Substance use, Personality/ Sexual/ Eating disorder, Organic brain disorder management, legal issue in mental health nursing, Community mental health nursing.

6. **Midwifery & Gynaecology:** Anatomy of female reproductive system, Fundamentals of reproduction, Diagnosis of pregnancy, Fetus in utero, The fetus.

7. **Paediatric Nursing:** Immunization, Nutrition, Newborn infant, Healthy child, Sick child, Congenital anomalies, Nutrition deficiency disorder.

8. **Community Health Nursing:** Health System in India, Health care delivery system, Health planning in India, Specialized community health services and Nurse's role, National health problem, National health programs, Demography and family welfare, Health Team, Health Information System, Health Agencies.

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English** | (15 Marks) |
| | **Grammar** | |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |

**ANNEXURE- V**

## SYLLABUS FOR JR. PHARMACIST

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. Core Subject** (60 Marks)

1. Pharmaceutics-I

a) Metrology
b) Sterilization
c) Processing of Tablets
d) Processing of Capsules

2. **Pharmaceutical Chemistry- I**

a) Acids, Bases and Buffers, Boric Acid, Hydrochloric Acid, Strong Ammonium Hydroxide, Calcium Hydroxide, Sodium Hydroxide and official Buffers.
b) Antioxidants, Hypophosphorous acid, Sulfur dioxide sodium bisulphate, Sodium metabisulfate, Sodium thiosulphate, Nitrogen and Sodium Nitrite.
c) Gastrointestinal Agents, Topical Agents, Dental Products, Inhalants, Respiratory Stimulants Expectorants and Emetics, Antidotes.
d) Electrolytes used for Replacement Therapy, Physiological Acid Base- Balance and Electrolytes used.

3. **Human Anatomy and Physiology**

a) Structure and Functions of Various Parts of Heart, Respiratory Systems, Urinary Systems, Skeletal Muscle, Central Nervous System, Brain, Taste, Smell, Ear, Eye & Skin.
b) Digestive System, Endocrine Glands and Hormones and Reproduction System.

4. **Pharmacognosy**

a) Occurance, distribution Organoleptic, evaluation- Laxative, Cardiotonics, Carminatives and G. I regulations, Astringents, Drugs acting on Nervous System
b) Anti Hypertensive, Antitussives, Anti rheumatics, Anti tumour, Antileprotics, Anti Diabetics, Antidysenterics, Anti septic and disinfectants, Anti malarials, Oxytocics, Vitamins, Enzymes, Perfumes and Flavouring Agents, Pharmaceutical Aids, Miscellaneous.
c) Study of Source, Preparations & identification of Fibres used in sutures and surgical dressing.
d) Gross anatomical Studies of Senna, Dhatura, Cinnamon, Clove, Ginger, Nux-vomica and Ipecacuanhe.

5. **Biochemistry and Clinical Pathology**

a) Brief Chemistry and role of proteins, Polypeptides and Amino Acids, Carbohydrates, Vitamins and Co-enzymes.
b) Brief Concepts of normal and abnormal metabolism of Proteins, Carbohydrates and Lipids.
c) Introduction to pathology of Blood and Urine-Lymphocytes and Platelets, Erythrocytes, Abnormal Constituents of Urine and their Significance in disease.

6. **Health Education And Community Pharmacy**

a) Concept of Nutrition and Health
b) First Aid
c) Communicable Diseases- Respiratory Infection, Intestinal Infections, Arthropod Bone Infections, Surface Infections, Sexually transmitted diseases.
d) Non-communicable diseases

7. **Pharmaceutics-II**

a) Dispensing Pharmacy- Prescription, Incompatibilities in prescriptions, Posology.
b) Dispensing Medications- Powders, Liquid oral Dosage forms, Ointments, Pastes, Jellies, Suppositories and pessaries.
c) Sterile dosage forms- Parenteral, Sterility testing, ophthalmic products.

8. **Pharmaceutical Chemistry- II:** Pharmaceutical Organic Chemistry- Antiseptics and Disinfectants, Sulfonamides, Antileprotic Drugs, Antitubercular drugs, Anti Amoebic & Antihelmintic Drugs, Antibiotics, Antifungal Agents, Antimalarials drugs, Hypontics, General Anesthetics, Local Anesthetics, Anti Depressant Drugs, Diuretic Drugs, Cardiovascular Drugs, Hypoglycemic Agents, Coagulants & Anticoagulants, Histamine & Antihistamine Agents, Analgesics and Antipyretics, Non Steroidal & Inflammatory Agents, Thyroxine & Anti Thyroids, Diagnostic Agents, Anti Neoplastic drugs.

9. **Pharmacology & Toxicology**

a) General Mechanism of Drugs Action
b) Pharmacological Classification- Local Anaesthetics, Respiratory System, Cardiovascular, Hormones & Hormone Antagonists.
c) Chemotherapy of Microbial Disease, Protozoal Diseases, Cancer.
d) Disinfectants & Antiseptics

10. **Pharmaceutical Jurisprudence**

a) Pharmacy act, 1948
b) The Drugs & Cosmetics Act, 1940
c) The Drugs & Magic remedies (Objectionable Advertisement) Act, 1954
d) Narcotic Drugs & Psychotropic Substances Act, 1985
e) Poisons Act, 1919
f) Medicinal & Toilet preparations (excise duties) Act, 1955, Medical Termination of Pregnancy Act, 1971

11. **Drug Store and Business Management:** Forms of Business Organisation, Channels of Distribution, Drugs House Management, Cash Book, General Ledger and Trial Balance

12. **Hospital and Clinical Pharmacy**

a) Drug distribution system in Hospitals- Out Patients service, inpatients service
b) Manufacturing- Economical Considerations, Sterile Manufacture, Non- Sterile Manufacture, Procurement of stores and Testing Raw Materials
c) Pharmacy Therapeutic Committee (PTC)
d) Surgical Dressing, Application of Computers in Hospital Pharmacy
e) Drugs Interactions, Drug-Drug Interaction, Drug Food interaction, Mechanism of drug interaction
f) Adverse Drug reaction, Drugs in Clinical Toxicity
g) Drug Dependence, Drug Abuse, Addictive Drugs & Treatment.

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English** | (15 Marks) |
| | **Grammar** | |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |

**ANNEXURE- VI**

## SYLLABUS FOR ELECTRICIAN-III

**Duration of Written Test- 2 Hours** **Total- 120 Marks**

**A. <u>Core Subject</u>** (60 Marks)

1. **Various safety measure involved in the industry:** Elementary first Aid, Concept of Standard Basic injury prevention, Basic first aid, Hazard identification and avoidance, Safety signs for Danger, warning, caution, personal safety message, Use of fire extinguisher, Personal Protective Equipment.
2. **Hand tools:** Specifications, Identification of simple type- screws, nuts & bolts, chassis, Clamps, Rivets etc., Use, care & maintenance of various hand tools, Familiarization with signs & symbols of electrical accessories.
3. **Fundamental of electricity:** Electron theory- free electron, Fundamental terms, definition, units & effects of electric current, Ohm's Law, Simple electrical Circuits and problems, Resistors — Law of Resistance, Series and parallel circuits., type of resistors, properties of resistors, Kirchhoff's Laws and applications, Effect of temperature on resistance, Different methods of measuring the values of resistance.
4. **Wires, joints & soldering:** Solders, flux and Soldering technique, Explanation, definition and properties of conductors, insulators, semi conductors, Voltage grading of different types of insulators, Temperature rise permissible, Type of wires and cables — insulations and voltage grade — Low, medium, high voltage, Precaution in using various types of cables, Insulating Materials- properties, common insulting materials, classifications.
5. **Chemical effect of Electric current:** Principle of electrolysis, Faraday's Law of Electrolysis, Basic Principle of electroplating and electrochemical equivalents, Explanation of anodes and cathodes, Rechargeable dry cells, Description, advantages & disadvantages, care and maintenance of cells, Grouping of cells of specified voltage and current, Lead acid cells, general defects and remedies, Nickel Alkali cells description charging, Power and capacity of cells, Efficiency of cell.
6. **Magnetism:** Classification of Magnets, Methods of Magnetizing, magnetic Materials, Properties, care & Maintenance, Para & Diamagnetism and Ferro magnetic materials, Principle of electro- magnetism, Maxwell's corkscrew rule, Fleming's left & right hand rules, Magnetic field of current carrying conductors, loop & solenoid, MMF, flux density,

Reluctance, B.H. curve, Hysteresis, eddy current, Principle of electro-magnetic induction, Faraday's law, Lenz's law. Electrostatics- capacitor- different types, functions and uses.

7. **D.C. Generators:** Introduction to D.C. Generators, Working principle of D.C. Generator, Parts of D.C. Generator, Classification of generators - self excited and separately excited- their application in practical field, Brief description of series, shunt and compound generators, their application, Explanation of armature reaction, Interlopes, commutation & EMF equation of D.C. Generator.
8. **D.C. Motors:** Working principle, Explanation of torque, speed, Back- EMF etc., Types, characteristic and practical application of D.C. motors, Related problems.
9. **Earthing:** Principle of different methods of earthing i.e. pipe, plate etc., Importance of earthing, improving of earth resistance, Earth leakage circuit Breaker (ELCB), Measurement of earth resistance by earth tester.
10. **Alternating Current:** Comparison & Advantages of D.C. & A.C., Alternating current & related terms-frequency, Instantaneous value, R.M.S. Value, Average value, Peak factor, form factor, Generation of sine wave, Phase and phase difference, Inductive & Capacitative reactance, Xi & Xc, Impedance (Z), power factor (P.f.), Vector diagram, Active and Reactive power, Simple problems on A.C. circuits, single phase & three-phase system etc., Problems on A.C. circuits, power consumption in series and parallel, Power factor etc., Concept of three — phase Star & Delta connection, Line and phase voltage, current & power in a 3 phase circuit with Balanced and Unbalanced load.
11. **Transformers:** Its construction, working, performance, parallel operation of transformer & their connections, S.C and O.C. tests, Cooling of transformer, Regulation and efficiency, Specification, Problem on EMF equation, transformation ratio, Characteristics of Ideal transformer. Construction of core, winding shielding, Auxiliary parts. — Breather, Conservator, Buchholz's relay, other protective devices, Transformer oil testing and Tap changing OFF load and ON load, Transformer bushing and termination, Auto transformer- its construction, working, Vector Group's, performance and uses.
12. **Alternator:** Parts of alternator, Principle of working, types of alternator, EMF equation, Various applications and power rating of alternators, General idea of loading and regulation of alternator, Parallel operation of alternator, Synchronizing methods.
13. **Electrical Measuring Instruments:** Construction and working principle of- Ammeter, Voltmeter, Ohm-meter, Wattmeter, Energy meter, Power Factor meter, Frequency meter, Multi meter, Clamp meter, Insulation Tester, Earth Tester, Introduction of Digital

meters, CT & PT, Tong tester/clamp on meter.

14. **Illumination:** Laws of illumination, Illumination factors, intensity of light, Importance of light, colour temperature, Construction, working and application of incandescent lamp-neon sign, halogen, mercury vapour, sodium vapour, fluorescent tube, CFL, LED, Decoration lighting, drum switches, efficiency in lumens per watt, Thumb rule calculation of lumens.
15. **AC Motor:** Introduction to AC single phase motors & types, Capacitors start/ run- start & run, Flame Proof Motors & their uses, various application of AC single phase motor, Construction, principle of operation of three phase induction motor, Squirrel Cage Induction motor, Slip ring induction motor, Rotor slip, Rotor frequency & Rotor torque, Factor affecting torque, Effect of variation in applied voltage, Starting methods, speed control methods, Importance of phase sequence in three phase induction motor, Single phasing preventer, D.O.L. Starter, Star- Delta starter, Autotransformer starter.
16. **Basic Electronics:** Semiconductor energy level, atomic structure, 'P' & 'N' Type, Type of materials-P-N-junction, Classification of Diodes- Reverse Bias and Forward Bias, Heat sink, Specification of Diode, PIV voting, Explanation and importance of D.C. rectifier circuit. Half wave, Full wave & Bridge circuit. Filter circuits — passive filter, Principle of working of a transistor- types of transistors, Characters of a transistor, Specification and rating of transistors.
17. **Electrical Wiring:** Introduction and explanation of electrical wiring system, Cleat wiring, casing and capping, CTS, Conduit and concealed etc., IE Rules relating to wiring, National building code for house wiring, Specification and types, rating and material, Branching of circuits with respect to loads such as lighting and power, IE Rules regarding clip distance, fixing of screws, cable bending etc., Common Electrical Accessories, their specifications — Explanation of switches, lamp holders, plugs and sockets etc., Development of domestic circuits, using switches, fuse, MCB, Socket, lamp, fan, calling bell/buzzer — Two way switch, ICDP, ICTP, MCCB, ELCB, RCCB etc., Importance of Neutral, effect of opening of neutral wire.

| Sl. No | Descriptive | Marks |
|---|---|---|
| B. | **General Awareness** | (15 Marks) |
| | a) Current national events and international events<br>b) General Knowledge like History/ Polity/ Geography of Odisha & India<br>c) Scientific Invention & use of Science in everyday life<br>d) Issues of environment, Ecology, Bio-diversity & Climate Change<br>e) Books and Authors | |
| C. | **Reasoning & Mental Ability** | (15 Marks) |
| | **A. Verbal**<br>I. Number Series<br>II. Alphabet Series<br>III. Test of Direction Sense<br>IV. Coding-decoding<br>V. Number Ranking<br>VI. Arithmetic Reasoning<br>VII. Algebraic equations<br>VIII. Word problems<br>IX. Problem of Age Calculation | |
| | **B. Non-verbal**<br>I. Non-verbal Series<br>II. Mirror Images<br>III. Cubes & Dice<br>IV. Grouping Identical Figures<br>V. Embedded Figures etc | |
| D. | **Quantitative Aptitude** | (15 Marks) |
| | a) Ratio and Proportion<br>b) Numbers<br>c) Linear equations<br>d) Surface area, volume<br>e) Trigonometry application<br>f) Word problem.<br>g) Time and Work<br>h) Speed and Distance<br>i) Square roots<br>j) Percentages and Averages<br>k) Profit, Loss and Discount<br>l) Probability, Statistics | |
| E. | **English Grammar** | (15 Marks) |
| | I. Fill in the blanks with articles, voices, Nouns/Pronouns<br>II. Verb<br>III. Agreement of the verb with subject<br>IV. Adverb<br>V. Preposition<br>VI. Tenses<br>VII. Conjunction<br>VIII. One word substitution<br>IX. Synonyms & Antonyms<br>X. Correct the sentence | |