ANNEXURE-II

SYLLABUS FOR GENERAL POSTS – ENGINEERING ASSISTANT (GRADE-II)

Written examination (Objective Type)	No. of Questions	Duration (minutes)	Maximum Marks
Part- A: General Studies and mental ability	50	50	50
PAPER-B: Civil/ Mechanical Engineering (Diploma standard)	100	100	100
TOTAL			**150**

Note: For each correct answer 1 mark will be awarded and each wrong answer will carry negative mark.

SYLLABUS FOR EXIMANITION TO THE POST OF ENGINEERING ASSISTANT (GRADE-II)

PART-A

GENERAL STUDIES AND MENTAL ABILITY

1. General Mental ability and reasoning.
2. Quantitative aptitude including data interpretation.
3. General English.
4. Current affairs of regional, national and International importance.
5. General Science and its applications to the day to day life, Contemporary development in science and Technology and information Technology.
6. History & Culture of India with specific focus on AP.
7. Indian polity and governance: constitutional issues, 73/74th Amendments, public policy, reforms ad centre – state relations with specific reference to Andhra Pradesh.
8. Society, Social justice, rights issues.
9. Physical geography of Indian sub-continent and Andhra Pradesh.
10. Key welfare & development schemes of Government of Andhra Pradesh.

PART-B

COMMON FOR CIVIL / MECHANICAL (Diploma Standard)

1. **Strength of Materials:** Simple stresses and strains for ductile materials-mechanical properties of materials-Hooke's law-lateral strain poisson's ratio-Elastic constants and the relations between them-Composite sections-Resilience-Strain energy-Gradual and sudden loading-shear force and Bending moment diagrams for cantilever, Simply supported, fixed, continuous and overhanging beams subjected to point loads and UDL. Theory of simple bending-assumptions-bending equation-bending stress-section modulus-shear stress distribution across various sections like rectangular, circular and I-sections-Torsion-solid and hollow circular shafts.

2. **Engineering Mechanics:** Statics, Resolution of force, Equilibrium of forces, Parallelogram law of forces, triangle law of forces, polygon law of forces and Lami`s theorem, Drawing the free body diagram, Centre of Gravity, Centre of Mass and centroid, Centroid of square, rectangle, triangle, semi-circle and trapezium, Centre of gravity of composite sections by analytical method `only (T-Section, L-Section I-section and channel section). Moment of Inertia, Theorems of Moment of Inertia. `i)

Parallel axes theorem, ii) Perpendicular axes theorem. c) Moment of Inertia for simple Geometrical Sections, Rectangular, circular and triangular section and Radius of Gyration. Calculation of Moment of Inertia and Radius of Gyration of a) I – Section, b) Channel Section, c) T – Section. d) L – Section, e) Z - section f) Built up Sections.

3. **Fluid Mechanics** Properties, Ideal and Real fluids, Newtonian and Non-Newtonian fluids, compressible and incompressible fluids, Units, Fluid properties, Intensity of pressure, Pascal's law, Atmospheric, Vacuum, Gauge and absolute pressures. Measurement of pressures by piezo-meter, , U-Tube - manometer, differential manometer bourdon pressure gauge, buoyancy, Flow of Liquids, Types of fluid flow- Steady and unsteady flow, Uniform and Non-uniform flow, Two &Three dimensional flow, Rotational & irrotational flow, Laminar & Turbulent flow, Reynold's Number. Pressure, potential and kinetic energy of liquids, total energy, Continuity equation for one-dimensional flow, Laws of conservation- Mass, Energy and Momentum, Velocity of liquids and discharge, Bernoulli's equation, Applications Venturimeters, pitot-tube, current meters, Flow through pipes, Various losses when liquid flows through pipes, Laws of fluid friction, The equations for loss of head in pipes due to friction, Minor losses in pipe flow, Hydraulic gradient and total energy line for different pipes, Pipes in series(Compound pipe) and equivalent pipe, Impact of jets, Force of jet striking at the centre and at the top of a fixed curved blade and moving curved blade, velocity triangles, Work done, power and efficiency.

4. **Hydraulic Pumps:** Function of a pump, Principle of operation of a reciprocating pump, single acting, double acting pumps, Effect of velocity and acceleration of fluids in suction and delivery pipes, Working principle & Constructional details of centrifugal pump, Comparison between Reciprocating and Centrifugal pumps, Priming of centrifugal pump and its necessary leakages of air its prevention, Work done by the impeller, Static head, Manometric head, Efficiencies- Manometric efficiency, Volumetric efficiency, Mechanical efficiency and Overall efficiency, Cavitation and its effect, Working principle of Jet & Submersible pumps.

5. **Engineering Drawing:** Construction of polygon: Construction of any regular polygon of given side using general method. Conical Curves: Ellipse, Parabola, Hyperbola, Eccentricity of above curves – Construction of ellipse by concentric circles method - Construction of parabola by rectangle method - Construction of rectangular hyperbola. Projection of points and Lines, projection of planes, projection of solids, Auxiliary views.

6. **Reinforced concrete structures:** Grades of concrete, characteristic strength, modulus of elasticity-I.S. 456 -2000-Philosophy of limit state design. Limit state of strength and serviceability, partial safety factor-design strength of materials and design loads - assumptions. Analysis and limit state design of rectangular beams singly, doubly reinforced and T-beams, Shear in RCC beams, lintels and sunshades-development length. Slabs analysis and limit state design of one way and two way slabs as per IS 456-2000 Torsion reinforcement. design of continuous slabs and beams Deflection check for slabs and beams. Detailing of reinforcement in singly reinforced and double reinforced simply supported beams of rectangular sections and lintels. one way and two way slabs. Columns: Codal provisions of I.S 456 2000 short and long columns different shapes design of short columns by limit state method -

long columns concept, effective length for different end conditions. footings-isolated column footings - one way shear and two way shear. Stairs-types, loads on stairs.

7. **Surveying:** Chain surveying - purpose and principle -errors and corrections - different operations in chain surveying - obstacles - methods of calculation of area. Compass surveying - purpose and principle - bearings - traversing using prismatic compass - local attraction - errors - Levelling - definitions - component parts - errors - classification of levelling - contouring - characteristics and methods. Theodolite - principles and component parts - fundamental lines and relationship among them - adjustments of theodolite - measurement of horizontal and vertical angles - errors - traverse computations - bowditoh and transit rule. Tachometry principle - stadia tachometry - tangential tachometry, principle and uses of E.D.M. Electronic Theodolite, total station, Global positioning system - Importance, G.I.S - use and applications in Civil Engineering.

8. **Production Technology:** Working and operations of lathe, Drilling, shaper, slotter, planner, milling machines - Capstan and turret lathes - copying lathes - surface finishing operations - Honing, lapping, super finishing, electro plating, metal spraying. Equipment used in arc and gas welding. modern welding methods - Submerged arc, atomic, hydrogen, CO2, and ultrasonic welding, Forging processes and tools - cold and hot working processes. Pattern types - types of moulding sand and their properties - Defects in casting and welding.