

**SYLLABUS FOR ENTRANCE EXAMINATION FOR THE POST OF**  
**WORKS MANAGER**  
**IN**  
**PEPSU ROAD TRANSPORT CORPORATION**

**TOTAL QUESTIONS: 100**

**TIME ALLOWED: 2.00 HOURS**

**SECTION A: GENERAL (40 QUESTIONS)**

**General Awareness and General Knowledge:** General information about the state of Punjab, Economy, Science and Technology, Current Events, History, Geography, Political Awareness/Polity, Persons in News, Places in News, Important Awards & Honours, Sports (08)

**Quantitative Aptitude:** Numbers, Simplification, HCF & LCM, Percentage, Average, Ratio & Proportion, Profit & Loss, Partnership, Time and Work, Time and Distance, Area and Volumes, Trigonometry, Probability, Permutations & Combinations. (08)

**Reasoning Ability:** Analogy / Analogous Problems, Classification, Word formation, Series, Ranking / Arrangement, Coding & Decoding, Distance and Direction, Symbol & Notation, Scheduled Day or Date, Mathematical problems, Problem Solving: Data Analysis. (07)

**Computer Awareness:** Introduction of Computer and History, Operating Systems, PC and System Software, Computer Network, Computer Devices, Windows, Microsoft Office, MS Word, MS Excel, MS PowerPoint, Internet Programming Language (HTML/DHTML), Security Aspects for PC, e world, Advanced Technology Regarding Computer, Various uses of Computers. (05)

**General Punjabi up to Matric standard** (05)

**General English:** Comprehension, Common Errors, Sentence Improvement, Fill in the blanks, Antonyms and Synonyms, Use of Propositions, Nouns, Adverbs and Adjectives, Change of voice, Direct & Indirect speech. (07)

**SECTION B: PROFESSIONAL (TOTAL: 60 QUESTIONS)**

**Thermodynamics and Heat Transfer:** Basic concepts, Open and Closed systems. Heat and work. Zeroth, First and Second Law, Application to non-Flow and Flow processes. Entropy, Availability, Irreversibility and TDS relations. Claperyron and real gas equations, Properties of ideal gases and vapours. Standard vapour, Gas power and thermodynamic cycles. Modes of heat transfer. One dimensional steady and unsteady conduction. Composite slab and Equivalent Resistance. Heat dissipation from extended surfaces, Heat exchangers, Overall heat transfer coefficient, Empirical correlations for heat transfer in laminar and turbulent flows and for free and forced Convection, Black body and basic concepts in Radiation.

**Strength of Materials:** Stress and strain in two dimensions, Principal stresses and strains, Mohr's construction, linear elastic materials, isotropy and anisotropy, stress-strain relations, uniaxial loading, thermal stresses. Beams: Bending moment and shear force diagram, bending stresses and deflection of beams. Shear stress distribution. Torsion of shafts, helical springs.

Combined stresses, thick-and thin-walled pressure vessels. Struts and columns. Strain energy concepts and theories of failure.

**Fluid Mechanics:** Properties and classification of fluids, Manometry, forces on immersed surfaces, Center of pressure, Buoyancy, Elements of stability of floating bodies. Kinematics and Dynamics. Irrotational and incompressible. Inviscid flow. Velocity potential, Pressure field and Forces on immersed bodies. Bernoulli's equation, fully developed flow through pipes, Pressure drop calculations, Measurement of flow rate and Pressure drop. Elements of boundary layer theory, Integral approach, Laminar and turbulent flows, Separations.

**Engineering Materials:** Basic concepts on structure of solids. Crystalline materials. Defects in crystalline materials. Alloys and binary phase diagrams. Structure and properties of common engineering materials. Heat treatment of steels. Plastics, Ceramics and composite materials. Common applications of various materials.

**Theory of Machines & Machine Design:** Kinematic and dynamic analysis of planar mechanisms. Cams. Gears and gear trains. Flywheels. Governors. Balancing of rigid rotors and field balancing. Balancing of single and multi-cylinder engines, Linear vibration analysis of mechanical systems. Critical speeds and whirling of shafts Automatic controls. Design of Joints: cotters, keys, splines, welded joints, threaded fasteners, Fits and tolerances. Design of friction drives: couplings and clutches, belt and chain drives, power screws, pulleys. Design of Power transmission systems: gears and gear drives shaft and axle, wire ropes. Design of pipe joints. Design of bearings: hydrodynamics bearings and rolling element bearings.

**Production Engineering:** Metal Forming: Basic Principles of forging, drawing and extrusion; High energy rate forming; Powder metallurgy. Metal Casting: Die casting, investment casting, Shell Moulding, Centrifugal Casting, Gating & Riser design; melting furnaces. Fabrication Processes: Principles of Gas, Arc, shielded arc Welding; Advanced Welding Processes, Weld ability: Metallurgy of Welding. Metal Cutting: Turning, Methods of Screw Production, Drilling, Boring, Milling, Gear Manufacturing, Production of flat surfaces, Grinding & Finishing Processes.

**Automobile Engineering:** Introduction to Conventional motor vehicle, vehicle classification, frame and frameless construction, power requirements, vehicle performance, Clutch and Transmission-Clutch Fundamentals, Different type of clutches, requirements for manual and automatic transmission, their type and constructional detail. Manual Transmission, Automatic Transmission, Torque Converter, Constantly variable transmission, dual shift gearbox. Steering and Suspension-Steering mechanisms and steering system including power steering, Steering gear ratio, suspension principle, rigid axle suspension and independent suspension, Mechanics of an independent suspension system. Introduction to driveline and its components, Differential and its gear ratio. Introduction to braking system and their types, stopping distance, Antiskid Braking System, Electronic Brake-force Distribution, Wheels and their types, Tubed and tubeless tyres, Radial tyres, Tyre specifications and coding, Catalytic converter and its types, Exhaust Gas Recirculation. Electrical and electronic systems in automobiles, starting motor drives, Automotive accessories and safety features in automobile, Vehicle Insurance, Indian Motor Vehicle Act, Traffic rules, Major tools used for maintenance of automobiles, Euro norms, Bharat norms, Trouble shooting in above modules.