

SYLLABUS FOR SCREENING TEST FOR RECRUITMENT TO THE POST OF ASSISTANT MANAGER, KOLKATA TRANSPORT FLEET.

1. Engineering Mechanics:-

Statics, dynamics, force, system of force, lami's theorem, moment of force, varignon's theorem, principle of moments, parallel force, couple, centre of gravity, moment of inertia, friction and laws, limiting angle of friction, angle of repose, lifting machine, system of pulleys, frame, equation of linear motion, Newton's law of motion, mass, weight & momentum, D'Alembert's principle, motion of a lift, projectile, Simple Harmonic Motion, simple pendulum, centre of percussion, centrifugal and centripetal force, collision of two bodies, work, power, energy.

2. Strength of Materials.-

Stress, strain, modulus of elasticity, shear stress, shear strain, modulus of rigidity, stress in a bars of varying section, stress in a bars of uniformly tapering, circular section, stress in compound bars, thermal stress, stress on an oblique section of a body subjected to direct stress in one plane, resilience, types of beams, types of loading, shear force and bending moment diagram, theory of bending, beam of uniform strength, beams of composite section, shear stress in beams, deflection of beams, shear stress in a shaft, spring, riveted joints, column and struts.

3. Hydraulic and fluid machineries:-

Properties of liquid, pressure of liquid, pascal's law, total pressure and centre of pressure, lock gate, buoyancy, equilibrium of floating bodies, metacentre and metacentre height, fluid kinematics, types of flow in pipes, dynamics of fluid, Bernoulli's equation, venturimeter, orifice meter and pitot tubes, notches and weirs, pipes and channels, siphon, water hammering, flow through open channel, impact of jets, hydraulic turbines, reaction turbines, centrifugal pumps, reciprocating pumps, air vessels, miscellaneous hydraulic machines.

4. Thermal Engineering:-

Thermodynamics systems, properties of systems, laws of thermodynamics, law of perfect gases, general gas equation, characteristics equation of gas, Joule's law, Avagadro's law, molar constant, specific heat of gas, thermodynamics processes of perfect gas, general laws of expansion and compression, Entropy, Thermodynamic cycle, classification of thermodynamic cycles, efficiency of cycle, Carnot cycle, Otto cycle, Diesel cycle, Gas turbines, fuels and combustion.

5. Steam Boilers and Engines:-

Classification of steam boilers, simple vertical boilers, Cochran boiler, Lancashire boiler, boiler mounting, boiler accessories, boiler performance, boiler efficiency, chimney, steam engines.

6. Steam nozzle and Turbines:-

Classification of nozzle, Nozzle efficiency, steam turbines, classification of steam turbines.

7. I.C. Engine:-

Two stroke and four stroke cycle engines, sequence of operation in a cycle, advantages and disadvantages of two stroke over four stroke cycle engines, comparison of petrol and diesel engine, scavenging of IC Engines, Ignition system of petrol engine, Turbocharger of IC engine, lubrication of IC engines, Governing of IC Engines, Fuel Injection pump, Type of FIP, carburettor, spark plug, detonation in IC Engines, octane number, cetane number, testing of IC Engine.

8. Compressor, gas dynamics and Gas turbines:-

Terms used in air compressor, single stage reciprocating air compressor, two stage reciprocating air compressor with intercooler, efficiency of reciprocating air compressor, rotary air compressor, classification of gas turbines, open cycle gas turbine, application of gas turbines, jet propulsion.

9. Heat transfer, Refrigeration and Air Conditioning:-

Newton's law of cooling, Fourier's law of heat conduction, thermal conductivity, heat transfer through composite walls, thick cylinder and sphere, Overall coefficient of heat transfer, heat exchanger, radiation, Kirchhoff's law, refrigeration, coefficient of performance of refrigerator, vapour compression refrigeration system, vapour absorption refrigeration system, air conditioning, psychrometry, Dalton's law of partial pressure.

10. Theory of Machines:-

Kinematics pairs, classification of kinematics pairs, kinematic chain, Coriolis's components of acceleration, mechanisms with lower pairs, steering gear mechanisms, Hooke's joint, friction of pivot and collar bearing, flat belt drives, toothed gearing, terms used in gears, laws of gearing, gear trains, gyroscopic couple, types of governors, terms used in radial cams, vibration.

11. Engineering materials:-

Mechanical properties of metal, pig iron, cast iron, wrought iron, steel, alloy steel, free cutting steel, stainless steel, structure of solids, effect of grain size on mechanical properties, allotropic form of pure iron, iron carbon equilibrium diagram, heat treatment, non ferrous metals and alloys, high temperature alloys, metal for nuclear energy, plastics.

12. Workshop technology

Mechanical working of metals, hot working processes, cold working processes, pattern making, types of pattern, core boxes, foundry tools and equipments, moulding and core making, gates and risers, cores, special casting processes, detection in casting, welding, arc welding, gas welding, oxygen cutting of metals, sheet metal work, Die and punch, bench work and fitting.

Mechanics of metal cutting, metal cutting tools (single point cutting tools), tool wear, shear angle,

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tool life, lathe, drilling, drilling tools, cutting speed for drilling, taps, shaper and planer, grinding, grinding operation, milling machine, up milling, down milling, jigs and fixtures, broaching, ultrasonic machining, Electrochemical machining, electro discharge machining.

Workshop Organisation & vehicle Maintenance management, Motor vehicle Act & Transport management.

13. Production management and Inventory control:-

Work study, symbol used in work study, string diagram, time study, break even analysis, wage incentive plans, terms used in network planning, method, programme evaluation review technique (PERT), critical path method (CPM), organisation, inventory control, plant layouts, routing, scheduling & dispatching, linear programming.

14. Basic electrical Engineering:-

D.C. circuit, A.C. fundamentals, single phase and poly phase AC circuit, electromagnetism, single phase transformer and electrostatics.

16. Basic electronics Engineering:-

Semiconductor, diodes and applications, bi polar junction transistor.

17. Environmental pollution and control:-

Air pollution control method, particular control devices, methods of controlling, gaseous emissions, air quality standards, noise pollution, noise standards, measurement & control method, reducing residential and industrial noise.

18. Computer Application: Basic knowledge of computer operation, application and its application in various fields.