

NOTIFICATION No. 93/GEN/DOP Date: 27/06/2012

Rules for open competitive Examination to be conducted by the Sikkim Public Service Commission in 2012 for selection of candidates for appointment to the post of Assistant Engineer (Mechanical) are published for general information.

- 1) The number of vacancies to be filled up after the Examination will be specified in the Notice to be issued by the Sikkim Public Service Commission.
- 2) The Examination will be conducted by the Sikkim Public Service Commission according to syllabus and procedure as indicated in the **Appendix I** to these Rules.
- 3) The date and place of Examination will be fixed by the Sikkim Public Service Commission.
- 4) Candidate must write the answers in his/her own handwriting. Under no circumstance will he/she be allowed the help of an amanuensis to write the answers.
- 5) A candidate must pay fees as may be prescribed by the Commission.
- 6) The decision of the Commission as to the eligibility of a candidate for admission to the examination shall be final.
- 7) No candidate will be admitted to the examination unless he/she holds a certificate of admission issued by the Commission.
- 8) A Candidate who is or has been declared by the Commission to be guilty or any attempt on his/her part to obtain support for his/her candidature by any means shall render himself/herself liable to be disqualified for admission to the competitive examination.
- 9) The Commission shall have the discretion to fix the qualifying marks in any or all subjects in the written Examination.
- 10) The candidate must obtain the qualifying marks decided by Sikkim Public Service Commission in the written Examination. A candidate, who obtains such minimum qualifying marks in the written examination, as may be fixed by the Commission, shall be called for personality test. Personality test will be of 50 marks or as assigned by the Commission at its discretion.
- 11) The form and manner of announcement of results of the examinations shall be decided by the Commission. The Commission will not enter into any correspondence with any candidate regarding results.
- 12) After the examination and interview, the names of the successful candidates will be arranged by the Commission in the order of merit based on marks awarded to each candidate. Candidates shall be recommended for appointment to the available vacancies in the order in which their names appear in the list.
- 13) A candidate who is or has been declared by the Commission guilty of impersonation or of submitting false and fabricated documents which have been tampered with or of making statements which are incorrect or false or of

suppressing material information or of attempting to use unfair means in the examination hall or otherwise, or resorting to any or other irregular or improper means for obtaining admission to the examination hall may, in addition to rendering himself liable to criminal prosecution, be debarred:-

- (a) By the Commission permanently or for specified period for admission to any examination or appearance at any of the interviews held by the Commission for selection of candidates,
 - (b) By the State Government from any employment under it.
- 14) Candidates already in Central or State Government service or in Central or State Government owned undertaking or other organizations, whether in permanent or temporary capacity or as work charged employee shall be required to submit their application along with No Objection Certificate from the employer.
- 15) Success in the examination confers no right to appointment unless Government is satisfied after such enquiry as may be considered necessary that a candidate having regard to his/her character and antecedents is suitable in all respect for appointment.
- 16) A candidate must be in good health and free from any physical defect likely to interfere with the discharge of his duties as an officer of the Service. A candidate who (after such medical examination as may be prescribed by the competent authority) is found not to satisfy these requirements will not be appointed.
- 17) If a candidate's handwriting is not legible, a deduction may be made in this account from the total marks otherwise accruing to him/her.
- 18) No travelling and daily allowance will be paid for the journey performed in connection with the examination, interview and medical examination. All other matters not specified or for which no provision has been made in these rules shall be regulated by rules and orders applicable to the Service to which recruitments are being made.

BY ORDER

ADDITIONAL SECRETARY
DEPARTMENT OF PERSONNEL,
ADMINISTRATIVE REFORMS, TRAINING AND
PUBLIC GRIEVANCES

Copy for information to:-

1. Secretary, SPSC, - (10 copies)
2. File & Guard File

APPENDIX I

SCHEME AND SYLLABUS OF EXAMINATION FOR THE PURPOSE OF FILLING UP THE POST OF ASSISTANT ENGINEER (MECHANICAL).

The Examination will consist of 4 papers:-

PAPERS	SUBJECT	FULL MARKS	TIME ALLOWED
PAPER – I	GENERAL ENGLISH	50	1 HOUR
PAPER - II	GENERAL KNOWLEDGE	50	1 HOUR
PAPER - III	MECHANICAL ENGINEERING-I	300	3 HOURS
PAPER – IV	MECHANICAL ENGINEERING-II	300	3 HOURS
VIVA-VOCE	80 MARKS		

SYLLABUS

PAPER – I GENERAL ENGLISH

- i) Comprehension
- ii) Composition and Grammar

PAPER –II GENRAL KNOWLEDGE

- i) Current events of Local, National & International importance.
- ii) National level Schemes & Projects undertaken by Government of India.

PAPER III Mechanical Engineering

1. Thermodynamics, Cycles and IC Engines, 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 Refrigeration cycles. Two stage compressor. C-I and S.I. Engines. Pre-ignition, Detonation and Diesel-knock, Fuel injection and Carburation, Supercharging. Turbo-prop and Rocket engines, Engine Cooling, Emission & Control, Flue gas analysis, Measurement of Calorific values. Conventional and Nuclear fuels, Elements of Nuclear power production.

2. Heat Transfer and Refrigeration and Airconditioning. 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, Thermal boundary layer over a flat plate. Fundamentals of diffusive and connective mass transfer, Black body and basic concepts in Radiation, Enclosure theory, Shape factor, Net work analysis. Heat pump and Refrigeration cycles and systems, Refrigerants. Condensers, Evaporates and Expansion devices, Psychrometry, Charts and application to air conditioning, Sensible heating and cooling, Effective temperature, comfort indices, Load calculations, Solar refrigeration, controls, Duct design.

3. 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. Flow over weirs and notches. Open channel flow, Hydraulic jump. Dimensionless numbers, Dimensional analysis, Similitude and modelling. One-dimensional isentropic flow, Normal shock wave, Flow through convergent - divergent ducts, Oblique shock-wave, Rayleigh and Fanno lines.

4. Fluid Machinery and Steam Generators.

Performance, Operation and control of hydraulic Pump and impulse and reaction Turbines, Specific speed, Classification. Energy transfer, Coupling, Power transmission, Steam generators Fire-tube and water-tube boilers. Flow of steam through Nozzles and Diffusers, Wetness and condensation. Various types of steam and gas Turbines, Velocity diagrams. Partial admission. Reciprocating, Centrifugal and axial flow Compressors, Multistage compression, role of Mach Number, Reheat, Regeneration, Efficiency, Governance.

PAPER IV Mechanical Engineering

5. THEORY OF MACHINES:

Kinematic and dynamic analysis of planer mechanisms. Cams. Gears and gear trains. Flywheels. Governors. Balancing of rigid rotors and field balancing. Balancing of single and multicylinder engines, Linear vibration analysis of mechanical systems. Critical speeds and whirling of shafts Automatic controls.

6. MACHINE DESIGN :

Design of Joints : cotters, keys, splines, welded joints, threaded fasteners, joints formed by interference fits. Design of friction drives : couplings and clutches, belt and chain drives, power screws.

Design of Power transmission systems : gears and gear drives shaft and axle, wire ropes.

Design of bearings : hydrodynamics bearings and rolling element bearings.

7. 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.

8. 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.

9. 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, Weldability: Metallurgy of Welding.

Metal Cutting : Turning, Methods of Screw Production, Drilling, Boring, Milling, Gear Manufacturing, Production of flat surfaces, Grinding & Finishing Processes. Computer Controlled Manufacturing Systems-CNC, DNC, FMS, Automation and Robotics.

Cutting Tools Materials, Tool Geometry, Mechanism of Tool Wear, Tool Life & Machinability; Measurement of cutting forces. Economics of Machining. Unconventional Machining Processes. Jigs and Fixtures. Fits and tolerances, Measurement of surface texture, Comparators Alignment tests and reconditioning of Machine Tools.

10. INDUSTRIAL ENGINEERING :

Production Planning and Control : Forecasting - Moving average, exponential smoothing, Operations, scheduling; assembly line balancing, Product development, Break-even analysis, Capacity planning, PERT and CPM.

Control Operations : Inventory control ABC analysis, EOQ model, Materials requirement planning. Job design, Job standards, Work measurement, Quality Management - Quality analysis and control. Operations Research : Linear Programming - Graphical and Simplex methods, Transportation and assignment models. Single server queueing model.

Value Engineering : Value analysis for cost/value.

11. ELEMENTS OF COMPUTATION :

Computer Organisation, Flow charting, Features of Common computer Languages - FORTRAN, d Base III, Lotus 1-2-3, C and elementary Programming.

VIVA - VOCE

The test is intended to judge the mental caliber of candidate. In broad terms this is really an assessment of not only his intellectual qualities but also social traits and his interest in current affairs, mental alertness, critical powers of assimilation, care and logical exposition, balance of judgment, variety and depth of interest.

APPENDIX - II

CONDITIONS OF ELIGIBILITY FOR APPEARING IN THE EXAMINATION.

In order to be eligible to appear in the Competitive Examination, a candidate must satisfy the following conditions, namely:-

(a) Minimum Educational Qualification	Degree in Mechanical Engineering from a recognized University with three years of field experience in Engineering discipline under Central/State Government or under any registered Organisation/Company.
(b) Age	Should have attained the age of 21-30 years. (In case of Govt. servant, not more than 40 years). The maximum age limit is relaxable by five (5) years in the case of SC/ST/BL candidates and four (4) and three (3) years for MBC/OBC candidates, respectively.
(c) Other Requisites	(1) Preference will be given to Sikkim Government stipendaries/ seat reserved for State of Sikkim. (2) Should be conversant with the Custom and usages of Sikkim. (3) Should have knowledge of any of the State languages. (4) Should have valid Local Employment Card.
