

उप संचालक, बाष्पके, महाराष्ट्र कामगार सेवा, गट-अ
उद्योग, ऊर्जा व कामगार विभाग
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Industries, Energy and Labour Department

परीक्षेचे टप्पे:- १) लेखी परीक्षा- २०० गुण

२) मुलाखत - ५० गुण

-: परीक्षा योजना :-

विषय व सांकेतांक (९९७)	माध्यम	प्रश्नसंख्या	गुण	कालावधी	दर्जा	प्रश्नपत्रिकेचे स्वरूप
विषयाशी / विभागाशी संबंधित घटक	इंग्रजी	१००	२००	एक तास	पदवी	वस्तुनिष्ठ बहुपर्यायी

अ) नकारात्मक गुणदान -

१) प्रत्येक चुकीच्या उत्तराकरीता २५% किंवा १/४ एवढे गुण एकूण गुणांमधून वजा/ कमी करण्यात येतील.
२) एखाद्या प्रश्नाची एकापेक्षा अधिक उत्तरे दिली असल्यास अथवा ज्या उमेदवाराने उत्तरपत्रिकेत पूर्ण वर्तुळ चिन्हांकित केले नसेल अशा प्रश्नाचे उत्तर चुकीचे समजण्यात येऊन त्या प्रश्नाच्या उत्तराकरीता २५% किंवा १/४ एवढे गुण एकूण गुणांमधून वजा/कमी करण्यात येतील.
३) वरीलप्रमाणे कार्यपध्दतीचा अवलंब करताना एकूण अंतिम गुणांची बेरीज अपूर्णाकात आली तरीही ती अपूर्णाकातच राहिल व पुढील कार्यवाही त्याच्या आधारे करण्यात येईल.
४) एखाद्या प्रश्नाचे उत्तर अनुत्तरित असेल तर, अशा प्रकरणी नकारात्मक गुणांची पध्दत लागू असणार नाही.

ब) अंतिम गुणवत्ता यादी ही वस्तुनिष्ठ परीक्षेतील व मुलाखतीतील एकत्रित गुणांवर आधारीत राहिल.

-: अभ्यासक्रम :-

विषयाशी/विभागाशी संबंधित घटक यामध्ये खालील घटक व उपघटकांचा समावेश असेल.

Sr. No.	Topics and sub-topics
1.	<p>Basic concepts of thermodynamics Formation of steam, the thermodynamic properties of steam and the use of steam table, latent heat, sensible heat, degree of super heat, power plant cycles (basic and modified), energy, enthalpy, entropy, evaporation of water, circulation ratio, steam condensers, vacuum, condenser efficiency, modes of heat transfer. Evaluation of performance of steam power plant.</p> <p>Boiler water quality Impurities in water, pH, conductivity, boiler feed water treatment, boiler water analysis, hardness, oxygen scavenging methods, deaerator, effects of water on boilers, caustic and hydrogen embrittlement, water priming and carryover, causes of water hammer, boiler blowdown. (numerical may be preferred)</p>
2.	<p>Fuels and their combustion in boilers Classification of fuels, solid, liquid, and gaseous fuels, biomass firing in boilers, ultimate and proximate analysis, principles of combustion in boilers, combustion equations, theoretical and excess air calculations, calorific values of fuels, fuel supply and feeding system, air supply system, flue gas system, ash handling, environmental impact of emissions generated from boilers and its control, latest boiler pollution prevention techniques.</p>
3.	<p>Steam generation and distribution system Classification of boilers, fire tube boiler, water tube boiler, combi-pack boiler, package boiler, waste heat recovery boiler, FBC, CFBC boiler, sub-critical boiler, super-critical boiler, functions and differences between supercritical and ultra-supercritical boilers, their advantages and disadvantages, use of solar thermal energy boilers, role of boilers in combine heat and power (CHP), the purposes and reasons for employing different types of boilers, boiler specifications, circulation ratio, fluid flow, feed water system, steam distribution system, pressure reducing and de-superheating station, steam traps.</p>

4.	<p>Boiler mountings and accessories</p> <p>Function, needs and sizing of Boiler mountings and accessories, Safety valves, blowdown valves, gate valves, globe valves, high and low water indicators, low water cut off system, main steam stop valve (MSSV), non-return valve, pressure gauge, air vents valves, superheater, reheater, feed water pumps, feed injectors, feed regulators, soot blowers, economiser, air preheater, boiler fans, forced draught, induced draught, automatic draught control devices, and chimney.(numerical may be preferred)</p>
5.	<p>Boiler operation and maintenance</p> <p>Smart boiler monitoring system, boiler start-up and shutdown procedure, safety valve floating, banking of boiler, burner management system (BMS), record keeping, predictive and breakdown maintenance, the use of modern digital technologies and control systems in boilers to enhance efficiency and improve safety, different types of instrumentation and interlocks used in boilers, calculate boiler efficiency by direct and indirect method, evaporation ratio, heat loss calculations, performance evaluation of boiler, analysis of losses, energy conservation opportunities, calculate fuel consumption, and determine the overall efficiency of a boiler plant, Use of IoT.</p>
6.	<p>Legal and regulatory framework</p> <p>Salient Features of Indian Boiler Act and Indian Boiler Regulations, licensing and certification requirements, record keeping and documentation, calculate the safe working pressure for any part of a boiler in accordance with the Indian Boiler Regulations, awareness about Indian and international organisations related to boiler industry, latest abbreviations used in boiler industry.</p>
7.	<p>Boiler inspection, testing and repair procedure.</p> <p>Inspection techniques, corrosion, pitting, common boiler defects and their remedies, boiler maintenance and repairs, repair procedure, pressure testing, different pressure testing methods, Non-destructive examination, liquid penetrant test, magnetic particle test, ultrasonic test, radiographic test, destructive testing, hardness testing of metals, impact test, tensile test.</p>
8.	<p>Materials used in boiler and pipe construction.</p> <p>The latest advancement in boiler material science, boiler quality plates, CS plates, alloy steel plates, boiler tubes, tube classification, special tubes, ERW tubes, seamless tubes, boiler material as per Indian and ASME specification, tube versus pipe, casting, forging, basic metals employed in boiler construction, fundamental metallurgical aspects of steels used in boilers, heat treatment, alloying elements of steel, insulating materials used in boilers.</p> <p>Strength of materials and boiler design</p> <p>Strength of materials, stress, strain, toughness, brittleness, creep, fatigue strength, hardness, boiler design and engineering, design calculation methods and the factors to be considered in designing a boiler, boiler layout, pressure part arrangement, pressure and temperature drops across the boiler.</p> <p>Welding</p> <p>Types of weld joints, comparison of weld joints, weld setup, welding positions, heat affected zone, welding electrodes, general requirements for preheating and temperature control, post-weld heat treatment, and advanced welding technologies.</p>

दिनांक – १० मे, २०२४

अवर सचिव
महाराष्ट्र लोकसेवा आयोग