



# ARIHANT

## ENGINEERING ACADEMY

# OSSC-JE

(ODISHA STAFF SELECTION COMMISSION  
-JUNIOR ENGINEER)

*ONLINE TEST SERIES*

## MECHANICAL ENGINEERING - SCHEDULE

No. of Test:- 30	
Subject Wise Mock Test	13
Mixed Subject Mock Test	07
Full Length Test	10

- All tests will be activating as per the date and valid up to the exam.

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## OSSC JE SYLLABUS

### Mechanical Engineering

1. Strength of Materials

Stress and strain, Hooke's law, Young's Modulus, bulk modulus, Poisson's ratio, Relation between elastic constants, Types of beams & loads, concepts of shear force & bending moment, Shear force & Bending Moment Diagrams & their salient features in cantilever beam, simply supported beam & overhanging beam under point load & UDL. Bending stress, section modulus & neutral axis. Axial load & eccentric load in columns, buckling load in columns with various end connections.

2. Engineering Materials

Material classification into ferrous, non – ferrous category and alloys, physical and chemical properties, Classification, composition and application of low carbon steel, medium carbon steel and high carbon steel. Process of heat treatment, Annealing, normalizing, hardening. Tempering, stress relieving measures, surface hardening, carburizing, and nitriding. Effect of heat treatment on properties of steel. Reasons of corrosion and surface wear, purpose of painting and methods of industrial painting.

3. Thermal Engineering / Applied thermodynamics

Thermodynamic properties of a system (pressure, volume, temperature and units of measurement). Sensible heat, latent heat, specific heat. Conceptual explanation of energy, work and heat, introductory concept of conduction, convection and radiation of heat. Carnot cycle, Boyle's law, Charle's law, concept of I.C. engine, Otto Cycle, Diesel Cycle, Hydrocarbon fuel, Quality of I.C. engine fuels, Octane number, Cetane number.

4. Theory of Machines

Link, kinematic chain, mechanism, cam and followers, friction between nut and screw for square thread. Screw jack. Description of roller and ball bearings. Flat collar bearings, working of simple frictional brakes. Concept of power transmission, gear driver spur drives & worm gear drives.

5. Manufacturing technology / Production technology

Physical properties and uses of cutting tool materials, coolants and lubricants in machine, Major components of lathe and their functions, different operations carried out in a lathe. Safety measures during machining, shaper machine uses, major components and their functions. Types of milting machines and operations performed by them. Grinding machine and its operation. Working of cylindrical grinder, surface grinder and center less grinder. Criteria for selection of grinding wheels, working of bench drilling machine, pillar drilling machine and radial drilling machine. Basic concept of boring, difference between boring and drilling .surface finishing and lapping. Welding pressure and welding electrodes. TIG welding and MIG welding process. Testing of welding joints, jigs and fixtures, definitions and advantages of using them.

6. Fluid Mechanics and Hydraulic machines

Properties of fluids, definition and units of fluid pressure, pressure intensity and pressure head, concept of atmospheric pressure, gauge pressure and absolute pressure, manometers, hydrostatic pressure, center of pressure on immersed bodies. Archimedes principle, concept of buoyancy, types of fluid flow, Bournouli's theorem, venturimeter, pitot tube, orifice coefficient ( $C_c$ ,  $C_v$  and  $C_d$ ) and relation among them. Definition of pipe, laws of fluid friction, head loss due to friction. Hydraulic gradient. Definition and classification of pumps, centrifugal pumps. Cavitation causes

and its effects. Reciprocating pumps, construction & working principle of single acting & double acting reciprocating pumps.

7. Machine design

Types of loads, working stress, yield stress, ultimate stress and factor of safety. Mechanical properties of material. Design of screw thread, types of welded joints, advantages of welded joints over other joints, strength of welded joints, design of solid & hollow shafts, function of keys for shafts, types of keys, design of rectangular sunk key.

8. Industrial Engineering & Quality Control

Objectives of inventory, control, definition of inspection and quality control, types of inspections, study of influencing the quality of manufacture.

9. Automobile Engineering

Working principle of petrol engine, carburection and fuel ratio, battery ignition and magnet ignition system. MPFI system, working principle of Diesel Engine, Feed Pump injector. Working principle of fuel injection system of multi cylinder engine. Clutch System- need types and working principle. Gear box and its purpose, construction and working of four speed gear box. Differential; need, type and working principle, Braking system in automobile types and working principle. Description of convectional suspension system for rear and from axles. Description of independent suspension system used in cars. Necessity of cooling system in Automobile Engine. Defects in cooling and their remedial measures. Function of lubrication system in I.C. engine .

**OSSC – JE Online Test Series**

**Test Packages**

S. No	Test series Title	Stream	Total Test	Price
1	OSSC – JE Prelims Online Test Series	ME	24	1000/-

**Test Details**

S. No	Test Name	Test Type	Subject/ Syllabus	Tests	Questions	Marks	Duration	Total Tests	Total Questions
1	OSSC – JE Online Test Series	Subject wise Tests	Full Syllabus	12	60	60	60 Minutes	24	1920
2		Mixed Subjects Test	Full Syllabus	5	100	100	90 Minutes		
3		Full Length Mock Tests	Full Syllabus	7	100	100	90 Minutes		

**Test Schedule**

**ME**

**OSSC – JE 2021 – 22 Prelims Online Test Series Schedule**

**Mechanical Engineering**

<b>Test No./Name</b>	<b>Start Date</b>	<b>End Date</b>	<b>Subjects/ Topic Covered</b>	<b>No. of Questions</b>	<b>Total Marks</b>	<b>Total Time</b>	<b>Minus Marks</b>
Subject wise Test – 01 Strength of Material	03.12.2021	Till OSSC – JE 2022 Prelims Exam	Strength of Material	60	60	60	¼ Marks
Subject Wise Test – 02 Engineering Materials	06.12.2021	Till OSSC – JE 2022 Prelims Exam	Engineering Materials	60	60	60	¼ Marks
Subject wise test – 03 Thermal Engineering	10.12.2021	Till OSSC – JE 2022 Prelims Exam	Thermal Engineering	60	60	60	¼ Marks
Subject wise test – 04 Applied Thermodynamics	13.12.2021	Till OSSC – JE 2022 Prelims Exam	Thermodynamics	60	60	60	¼ Marks
Subject wise test – 05 Theory of Machines	17.12.2021	Till OSSC – JE 2022 Prelims Exam	Theory of Machines	60	60	60	¼ Marks
Subject wise test – 06 Machine Design	20.12.2021	Till OSSC – JE 2022 Prelims Exam	Machine design	60	60	60	¼ Marks
Subject wise test – 07 Automobile Engineering	24.12.2021	Till OSSC – JE 2022 Prelims Exam	Automobile Engineering	60	60	60	¼ Marks
Subject wise test – 08 Manufacturing / Production Technologies	27.12.2021	Till OSSC – JE 2022 Prelims Exam	Manufacturing / Production Technologies	60	60	60	¼ Marks
Subject wise test – 09 Fluid Mechanics & Hydraulic Machines	31.12.2021	Till OSSC – JE 2022 Prelims Exam	Manufacturing ( Cutting tool + Metrology + Non convectional Machinery )	60	60	60	¼ Marks
Subject wise test – 10		Till OSSC – JE 2022	Fluid Mechanics & Hydraulic				¼

Industrial Engineering & Quality Control	03.01.2022	Prelims Exam	Machines	60	60	60	Marks
Subject wise test -11	07.01.2022	Till OSSC – JE 2022 Prelims Exam	Fluid Machinery	60	60	60	¼ Marks
Subject wise test -12	10.01.2022	Till OSSC – JE 2022 Prelims Exam	Industrial Engineering & Quality Control	60	60	60	¼ Marks
Mixed Test - 01	14.01.2022	Till OSSC – JE 2022 Prelims Exam	SOM + Engineering Material.	100	100	90	¼ Marks
Mixed Test -02	17.01.2022	Till OSSC – JE 2022 Prelims Exam	Thermal Engineering + Thermodynamics	100	100	90	¼ Marks
Mixed Test -03	21.01.2022	Till OSSC – JE 2022 Prelims Exam	Theory of Machine + Machine Design + Automobile Engg	100	100	90	¼ Marks
Mixed Test -04	24.01.2022	Till OSSC – JE 2022 Prelims Exam	Manufacturing (Casting + welding + forming) + Manufacturing (cutting tool + Metrology + Non – convectional machinery) + Industrial Engg. Quality control	100	100	90	¼ Marks
Mixed Test – 05	28.01.2022	Till OSSC – JE 2022 Prelims Exam	Fluid Mechanics + Fluid machinery	100	100	90	¼ Marks
Full Length Test - 01	31.01.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	¼ Marks
Full Length Test -02	04.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	¼ Marks

Full Length Test -03	07.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	$\frac{1}{4}$ Marks
Full Length Test -04	11.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	$\frac{1}{4}$ Marks
Full Length Test -05	14.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	$\frac{1}{4}$ Marks
Full Length Test – 06	18.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	$\frac{1}{4}$ Marks
Full length Test – 07	21.02.2022	Till OSSC – JE 2022 Prelims Exam	Full Syllabus	100	100	90	$\frac{1}{4}$ Marks