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k)ff° M 100

pQL)ff° M 40

Examination System	No. Of Question x Marks	Time
Short Question	15 x 2 = 30	60 Min.
Long Question	8 x 5 = 40	90 Min.
Multiple Choice	10 x 1 = 10	10 Min.
True And False	10 x 1 = 10	10 Min.
Fill In The Blanks	10 x 1 = 10	10 Min.

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**Detail Syllabus
for
Mechanical Engineer, T/Lt**

1. ENGINEERING MECHANICS

Introduction of Mechanics, Statics Of Particles, Statics Of Rigid Bodies, Introduction To Vector Algebra, Force On Particles And Rigid Bodies, Distribute Force, Friction, Types Of Structures, Analysis Of Frames And Mechanisms, Analysis Of Plan Trusses, Introduction To Space Trusses, Analysis Of Beams, Introduction To Dynamics, Rectilinear Motion of Particles, Curvilinear Motion of Particles, Kinetics Of Particles, Newton's Second Law, Kinetics Of Particles, Energy And Momentum Methods, Systems Of Particles, Kinematics Of Rigid Bodies, Plane Motion Of Rigid Bodies, Force, Moments And Acceleration, Plane Motion Of Rigid Bodies: Energy And Momentum Methods, Mechanical Vibrations

2. COMPUTER PROGRAMMING

Introduction to Computers, Problem Solving Using Computer, Introduction to Low Level and High Level Language, Input and Output Statement, Control Statement and Structure of programs

3. ENGINEERING DRAWING

Instrumental Drawing, Practices, Techniques, Free Hand Technical Lettering, Dimensioning, Applied Geometry, Solid Geometrical, Construction, Basic Descriptive Geometry, Theory Of Projection Drawing, Multiview Drawings, Sectional Views, Auxiliary Views, Free Hand Sketching And Visualization, Developments And Intersections, Practicles Drawing : Isometric ,Oblique Projection, Perspective Projection, Design And Projection Drawings : Machine Drawings, Welding And Riveting, Piping Diagrams, Structural Drawing, Electrical And Electronic Diagrams, Topographical Drawings, Graphs, Chart And Nomograms, Reproduction And Duplicating Of Engineering Drawings

4. WORKSHOP TECHNOLOGY

Bench Tools And Basic Hands Operations, Hand Working Operations, Power Tools, Measuring Gagging, Drill And Drilling Processes, Machine Tools, Material Properties, Sheet Metal Work, Metal Joining, Machine Tools, Shapers Construction, Milling Machines, Turretalthes - Production

Work, Grinding Machine, Planers, Jig Borers, Material Properties And Machinability, Heat Treating Methods, Machine Ability, Metal Joining And Cutting, Gas Weldings, Arc Weldings, Cutting

5. STRENGTH OF MATERIALS

Introduction :-Concept Of Stress, Stress And Strain – Axial Loading, Torsion, Pure Bending, Transverse Loading, Transformation Of Stress And Strain, Design Of Beams And Shafts For Strength, Deflection Of Beams By Integration, Deflection Of Beams By Moment-Area Method, Columns : Stability Of Structure Under Load ,Euler's Formula

6. THERMODYNAMICS

Thermodynamic Properties, First Law Of Thermodynamics, Second Law Of Thermodynamics, Conservation Of Energy, Processes For An Ideal Gas, Liquids And Vapours, Power Generation : Boiler And Associated, Equipment, Water Treatment, Ranking Cycle, General Property Relations And Equipment, Air Compressors, Refrigeration, Air Conditioning, Steam Turbine,

7. ELECTRIC CIRCUITS

Circuit Elements, Series and Parallel Circuits, Kirchoff's Laws, Network Analysis Theorem, Single phase AC Circuit Analysis, Power and Energy in AC Circuits, Three Phase Circuit Analysis,

8. FLUID MECHANICS

Fluid Properties And Definitions, Fluid Statics, Kinematics Of Fluid Flow, Basic Equation For Fluid Flow, Viscous Effects, Dimensional Analysis And Dynamic Similitude, Flow Measurement, Closed Conduit Flow, Introduction Of Turbo mechanics, Dynamic Action Of Fluid, Hydroelectric Plants, Water Turbine, Water Turbine Governors, Pumps, Steam Turbine, Introduction Of Gas Turbine,

9. MANUFACTURING AND PRODUCTION PROCESSES

Overview Of Manufacturing, Manufacturing Properties Of Materials, Properties Of Manufactured Product, Solidification Processes, Bulk Deformation Processes, Sheet Metal Product Manufacturing Processes, Material Removal Processes : Chip-Forming, Material Removal Processes " Abrasive And Non Traditional ", Material Joining, Numerical Control Of Machine Tools, Design For Manufacture,

10. MECHANISM

Introduction Of Mechanisms, Linkages And Mechanism, Cams And Followers, Spur Gears, Bevel, Helical And Worm Gears, Simple And Planetary Gear Trains, Kinematics Analysis Of Mechanisms, Force Analysis Of Mechanisms

11. METROLOGY

Errors In Measurement, Light Waves As Standards Of Length, Linear Measurement, Angular Measurement And Circular Division, Limits And Limits Gages, Machine Tools Metrology, Gear Measurement , Measurement Of Screw Threads BACHELOR'S DEGREE IN, Measurement Of Surface Finish, Statistical Quality Control

12. INSTRUMENTATION AND MEASUREMENT

Fundamentals Of Measurement, Time Dependent Properties Of Analog Signals, Response Of Measurement System, Sensors, Measurement Of Strain And Stress, Measurement Of Force And Torque, Pressure Measurement, Measurement Of Fluid Flow, Temperature Measurement, Motion Measurement (Acceleration, Velocity And Displacement)

13. METALLURGY

Introduction Of Materials, Atomic Structure, Arrangement Of Atom And Their Movements, Controlling The Microstructure To Achieve Desired Mechanical Properties

14. ORGANIZATION AND MANAGEMENT

Introduction to Organizational Management, Management, Internal Organization Of Companies, Management Information System, Motivating And Leading People, Personnel Management, Case Studies

15. HEAT TRANSFER

Modes Of Heat Transfer, Conduction Heat Transfer, Convective Heat Transfer, Radiation Heat Transfer, Heat Exchangers, Boiling Heat Transfer

16. MACHINE DYNAMICS

Introduction of Rigid Bodies, Engine Force Analysis, Force On Gear Teeth, Force Analysis Of Cams And Followers, Gyroscopic Forces, Balance Of Machinery, Vibration Of Single Degree Of Freedom Systems, Vibration Of Discrete Mass Systems, Approximate Numerical Methods, Continuous Systems

17. MECHANICS OF SOLID

Theories Of Stress And Strain, Stress-Strain-Temperature Relations, Energy Methods: Elastic Deflections And Statically Indeterminate Structures, Torsion, Non-Symmetrical Bending Of Straight Beams, Shear Centers For Thin-Wall Beam Cross Sections, Curved Beams, Beams On Elastic Foundations, Thick-Wall Cylinders, Contact Stresses

18. ELECTRIC MACHINES

Magnetic Circuit Concepts, Transformer, Principles of Electromechanical Energy Conversion, General Aspects of Modeling and Steady State performance of DC machines
DC Motors, DC Generators, Control of DC Machines in the steady state, Induction Machines, Synchronous Machines

19. MACHINE COMPONENT DESIGN

Force Affecting Choice Of Materials For Design, Common Types Of Failure, Working Stresses And strength Considerations, Shafts And Axes For Power Transmission, Ball And Roller Bearings, Clutches And Brakes, Mechanical Drives, Strength Of Gear Teeth, Power Screws, Springs, Welded, Riveted And Bolted Connections, Lubrication, Miscellaneous Machine Elements

20. CONTROL SYSTEMS

Component Modeling, Linearization, System Transfer Functions and Responses, Stability, Root Locus Method, Frequency Response Methods, Performance Specifications for Control System, Compensation and Design

21. HEAT ENGINES

Internal Combustion Engine Processes, Air-Standard Engine Cycles, Performance Of Internal Combustion Engines, Ignition Systems, External Combustion Engines, Deviations From The Ideal Combustion Process, Thermal Power Generation

22. ENERGY RESOURCES AND COMBUSTION PROCESSES

Worlds Energy Resources, Fossil Fuels And Characteristics, Nuclear Fuels, Solar Energy Radiation, Biomass Fuels And Characteristics, Hydrogen, Combustion Processes, Energy Storage And Transfer

23. INDUSTRIAL ENGINEERING AND MANAGEMENT

Introduction To Industrial Engineering And Management, Design Of Production Systems, Production Planning And Control, Forecasting Techniques, Quality Management

24. MECHANICAL ENGINEERING DESIGN

The Design Process, Problem Solving And Decision Making, Modeling And Simulation, Optimization Techniques, Materials Selection, Interaction Of Materials, Processing And Design, Risk And Reliability Of Design, The Practice Of Design- Selected Design Case Studies

25. AUTOMOBILE ENGINEERING

Introduction Automobile, Clutch, Gear Box, Universal Joint And Propeller Shaft, Rear Axle, Wheel And Tires, Chassis, Suspension System, Brakes, Electrical And Electronics System, Steering System, Motor Considerations, Safety Considerations, Emission Control System, Vehicle Rules And Acts, Workshop Layout And Vehicle Maintenance

26. RENEWABLE ENERGY UTILIZATION

Solar Energy And Its Application, Biomass Energy Technologies, Wind Energy Systems, Micro And Small Hydroelectric Systems, Lack And Ocean Water Power Systems, Economics Of Renewable Energy Systems

27. COMPUTER AIDED DESIGN

2D Drawing Construction, Drawing Aids In Auto Cad, Drawing Tools In Auto Cad, Modifying Commands In Auto CAD, Getting Information In Auto CAD, Fine Tuning Drawings In Auto CAD, Working With Text In Auto CAD, Grouping In Auto CAD, Dimensioning In Auto CAD, 3D Drawing Construction, Rendering And Solids, Plotting Drawings, Introduction To Cam, NC Machines, CNC And DNC, Fundamentals Of Part Programming, Introduction To FMS

28. ORGANIC AND COMPOSITE MATERIALS

Polymers, Ceramic Materials, Composite Materials

29. POLLUTION CONTROL

Air Pollution, Water Pollution, Land Pollution, Noise Pollution, Indoor Air Quality, Global Impacts

30. REFRIGRATION AND AIR-CONDITIONING

Air Refrigeration System, Vapor Compression System, Conventional Refrigerants And Ozone Depletion, Unconventional Refrigeration System, Cryogenics, Control Components, Food Preservation, Psychometric, Comfort Air Conditioning, System Load Determination

31. INDUSTRIAL ENGINEERING AND MANAGEMENT

Productivity, Quality And Cost, Concept Of Decision-Making, Job Design And Work Management, Material Management, Material Requirements Planning, Total Quality Management

32. FORECASTING TECHNIQUES AND INVENTORY CONTROL

Introduction of Forecasting, Types Of Forecasting Techniques, Time Series Methods, Causal Models, Qualitative Or Judgmental Methods, Basic Inventory Models, Multi-Item Joint Replenishment, Inventory System Under Risk, Use Of Simulation Techniques In Inventory Control Problems

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- 4= plQ)ff° M 25
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S.N.	Topic	Marks	Time-Minutes
1.	Machine Parts Identification	5	5
2.	Automobile Parts Identification	10	5
3.	Use Various Measuring Instruments	10	10
4.	Detail Description of a Machine	15	10
5.	Skill in using basic tools	5	10
6.	Workshop Administration	5	5
Total		50	45

1= Machine Parts Identification:

k/liffyl)h layout u/l /flvPsf laleGg Machine Parts sfl Technical gfd n)vg' kgj xG% / lbOPsf) Parts sxf sxf kpf)u xG% eGg) ; d)† vnfpg' kgj % . o; df 5 kšf/sf ; fdfgx? b)vf0g) / k)foš gfd / kpf)u ; lx ePdf 1 cš kpf)g ul/g) .

2= Automobile Parts Identification

k/liffyl)h layout u/l /flvPsf laleGg Automobile Parts gfd n)vg' kgj xG% / lbOPsf) Parts sxf sxf kpf)u xG% eGg) ; d)† vnfpg' kgj % . o; df 10 kšf/sf ; fdfgx? b)vf0g) / k)fošsf) gfd / kpf)u ; lx ePdf 1 cš kpf)g ul/g) .

3= Use Various Measuring Instruments

k/liffyl)hf0{ laleGg kšf/sf Measuring Instrument lb0g) . pQm measuring Instruments kpf)u u/) s)g) Ps a:tšf Density, Weight, Mass kQf nufpg' kgj xG% . k)† ; lx answer sfl cš 2 kpf)g ul/g) .

4= Detail Description of a Machine

k/liffyl)h s)g) Ps machine sfl af)df lgd)g s')fx? kšf; kfg) kgj % .

-s_ kpf)udf c)pg) c) :yf / o; af^ ug) ; lsg) sfdx? =====3

-v_ Working Principal of the machine =====5

-u_ Machine df sfd ug) tl/sf =====7

- 1. Machine Setup2
- 2. Functionality Check..... 2
- 3 Working Procedure3

5= Skill in using basic tools

k/liffyl)hf0{ workshop df kpf)u x)g) s)g) 5 j ^f tools kpf)u ug) nuf0g) % . kpf)u ; lx ePdf 1 cšsf) b/n) marks kpf)g ul/g) .

6= Workshop Administration

k/liffyl)hf0{ workshop administration ; DaGwdf Viva kZg ln0g), pQm Viva df 5 j ^f kZg ; flwg) . k)foš ; lx pQm/sfl cš 1 kpf)g ul/g) .

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S.N.	Topics	marks	time(min)
1	Machine Part Identification	10	20
2	Machine parts to blue print drawing	10	20
3	Auto cad drawing	20	60
4	Viva Session	10	20

6_ Machine Part Identification

-s_ o; Section df k/līfsn] 2 j ^f Blue print drawing Layout u/l /fv}sf] xg}%. .

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-u_ k/līfylv) s] n Machine dfq atfPdf 2 cš / Component 4 j ^f atfPdf k[ō}ssļ 2 cš u/l ķpfg ul/g}%. .

7= Machine parts to blue print drawing–

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8= Auto cad drawing-

-s_ o; ; } ; gdf k/Lifsn] k/Liffyl{hf0{ d]sf]gsn kf^{ sf] Drawing lbg}%g k/Liffyl{h} ; fl Drawing cg' f/ Auto cad df Drawing agfpg' kg}% .

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9= Viva:-

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