

DIPLOMA (MECHANICAL) – PART FOUR

Optional Early Certificate: - Certificate (Mechanical)

Syllabus:-

Sr. No.	Module Code	Name of Module	Credits	Total Marks
1	MC22-16	Machine Design & Drawing - I	5	100
2	MC22-17	Computer Application for Engineering	4	100
3	MC22-18	Industrial Management	4	100
4	MC22-19	Strength of Materials	4	100
5	MC22-20	Workshop Technology - II	4	100

Module Name: Machine Design and Drawing - I

1. Introduction to Design

- Basic Requirement for machine elements
- General Design Process
- Mechanical Properties
- General Design Consideration like Fatigue, Creep, Fabrication methods, economic Considerations for Strength
- Designing for Strength

2. Riveted and Welded Joint

- Types of Riveted joints
- Possible failure of riveted Joints
- Strength and efficiency of Riveted joints
- Common Types of Welded Joints
- Simple Design for V Butt welded Joints
- Transverse Fillet and Parallel fillet welded joints

3. Screwed Joints

- Introduction to term Screw and Various definition of Screw threads
- Advantage and Disadvantages of Screwed joints
- Form of Screw Threads
- Common types of Screw fastening: through bolt, tap bolt, Stud, cap Screw, Machine Screw and Set Screws
- Designation of Screw threads
- Stresses in Screw fastening

- Design of bolts for cylinder Cover
- 4. Keys and Couplings**
- Definition of Term Key; its various Types
- Splines
- Forces acting on Sunk keys
- shaft coupling and its various types
- Design of flangs coupling
- 5. Shafts**
- Various types of shafts
- Stresses in shafts
- Design of shafts(Solid and hollow) Subjected to torque and bending moment
- 6. Design of Cotter Joint for Round Rod**
- Design of Cotter
- Design of Socket
- Design of Spigot
- 7. Design of Knuckle Joint**
- Design of rod
- Design of Pin

Module Name: Computer Application for Engineering

- 1. Information Storage and Retrieval**
 - Need for Information storage and retrieval.
 - Creating database file.
 - Querying database file on Single and Multiple Keys.
 - Ordering the data on a selected key.
 - Programming a very simple application.
- 2. Programming in 'C'**
 - Basic Structure of C Programs.
 - Executing C programs.
 - Constants, variables and Data Types.
 - Operators and expressions.
 - Managing Input-Output operations like reading a character, writing a character, formatted input, Output through Print, Scan getch, putch statements etc.
 - Decision making and branching using IF.....else, switch go to statements.
 - Decision Masking and looping using do-while and for statements.
 - Array-one dimensional and two dimensional.
 - File
- 3. Computer Application Overview**
 - Commercial and Business data Processing application.
 - Engineering Computation.
 - CAD, CAM, CAE, CAI
- 4. Typical Applications**
 - Use of Various application Software available in the field of Electronics Engineering.

Module Name: Industrial Management

1. **Meaning, Nature and Significance of Management:** Concept of Management, Nature and Characteristics, Significance, role and Importance of Management, Scope, Level of Management.
2. **Management Process:** Element of the Process, Qualities of Successful Manager.
3. **Evolution of Management Thought:** School of Management Thought, Contribution of Elton Mayo to Management Science/Human relations Approach/ Hawthorne Experiments, Contribution of Max Weber to Management Science/ science, Management Science.
4. **Factors of Individual (Human) Behavior:** Concept and Important, factor influencing individual Behaviors.
5. **Perception:** Concept and Important, factor influencing individual Behavior, Stereo typing, Projection, Perceptual Change and Organization, Sensation.
6. **Learning:** Concept, Nature and Characteristics of Learning, Learning Procedure, Theories of Learning, Principles of Learning.
7. **Personality:** Concepts, Determinants of individual Personality, Measuring the Personality, Theories, Personality Traits, Personality and organizational behavior.
8. **Interpersonal Relationship and Group Behaviors :** Features and Characteristics of a group, Function of a group, Reasons of Group formation, Group development Process, types of Group, Theories of group Formation, Group Norms, group Cohesiveness.

Module Name: Strength of Materials

1. **Stresses and Strains**
 - Concept of Load, Stresses and strain
 - Tensile Compressive and shear stresses and strain
 - Concept of elasticity, Elastic Limit of Proportionality.
 - Hook's Law.
 - Young modulus of Elasticity.
 - Nominal Stress.
 - Yield Point, plastic stage.
 - strain hardening.
 - Ultimate strength and Breaking stress.
 - Proof stress and Working stress.
 - Factor of safety.
 - shear modulus.
 - Longitudinal and Circumferential stresses in seamless thin walled Cylindrical shells(Derivation of these formulae not required).
2. **Moment of Inertia**
 - Concept of moment of Inertia and Second moment of area.
 - Radius of gyration.
 - Second moment of area of Common Geometrical Sections: Rectangle, Triangle, Circle(Without derivation)Second moment of area for L,T and I Section.
 - Section Modulus.
3. **Beams and Bending Stress**
 - **Concept of beam and form of loading.**
concept of end supports, Roller, Hinged and fixed.
concept of Bending moment and shearing force.
B.M and S.F Diagram for cantilever and simply Supported beams with and without overhang subjected to concentrated and U.D.L.

- **Bending stresses**
 Concept of Bending stresses.
 Theory of Simple bending.
 Use of the equation $f/y=M/I+E/R$.
 Concept of Moment of resistance.
 Bending stress diagram.
 Calculation of maximum bending stress in beams of rectangular, Circular, I and T Section.
 Permissible Bending stress Section modulus for rectangular, Circular and Symmetrical I Section.
- **Laminated Spring(Semi elliptical type only)**
 Determination of number of Plates.
 Maximum bending stress and deflection.
- **Combined direct and bending stresses.**
 Simple Cases of Short column of uniform Section Subject to eccentric loading with stress diagram.

Module Name: Workshop Technology-II

1. Turning

- Principles of Turning.
- Description and function of main parts of lathe.
- Specification of lathe.
- Drives and Transmission.
- Work holding tools.
- Lathe tools.
- Lathe operations-plan and step turning , Facing, parting off, taper Turning, eccentric turning, drilling, reaming, boring, threading and knurling.
- Cutting Parameters-speed, feed and depth of cut.
- Speed ratio, preferred number of speed selection.
- Cutting fluid-its purpose and types.
- Lathe accessories (Steady rest, taper turning attachment, tool post grinder).
- Types of lather :(a) Brief description of capstan and turret lathes. (b) High Performance lathes.

2. Drilling :

- Principle of drilling.
- Classification of drilling machines and their description.
- Operations performed on drilling machines-drilling, reaming, counter boring, counter sinking, hole milling, tapping.
- Speed and feeds during drilling.
- Types of drills and their features.
- Drill holding device.

3. Boring

- Principle of boring.
- Classification of boring machines and their description.
- Specification of boring machine.
- Boring tools.
- Boring bars and boring heads.
- Alignment of bores and its importance.

4. Shaping, Planning and Slotting

- Working principle of shaper, Planer and slotter.
- Quick return mechanism applied to them.
- Types of tools used and their geometry.
- specifications of shaper, planer and slotting machine.
- Speed and feeds in above processes.