

ELEMENTARY MECHANICAL ENGINEERING AND ENGINEERING MATERIAL

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|-------------------------------|--------------------------------|----------|------------|---|----------|------------|
| Subject Code 00104 | Theory | | | No of Period in one session : 60 | | |
| | No. of Periods Per Week | | | Full Marks | : | 100 |
| | L | T | P/S | Annual Exam. | : | 80 |
| | 06 | - | - | Internal Exam. | : | 20 |

Rationale & Objective:

The technicians have to handle and deal with so many materials to be used in construction of Engineering product and making machine tools and structures etc. They have to face many problems involving general mechanical, electrical, electronics and civil Engg. As such the knowledge of general Engg. principles of different branches is essential for a Diploma holder.

The course has been designed with a view to include various materials commonly used in Engineering Constructions and general principles of working of different machine tools.

| <u>S.No.</u> | <u>Topics</u> | <u>Periods</u> |
|---|--|----------------|
| GROUP - A (Mechanical Engineering) | | |
| 1. | Simple machines | (06) |
| 2. | Introduction of ferrous & Non ferrous metals | (05) |
| 3. | General Process | (03) |
| 4. | Heat Engines & fluid machines | (06) |
| 5. | Power Transmission | (07) |
| 6. | Boilers | (03) |
| | Seperate answer books for group A & group B should be given in examination & answer books should be examination by Mechanical & Civil Engg. Teachers separately. | [30] |
| GROUP - B (Engineering Material) | | |
| 7. | Stones | (03) |
| 8. | Clay Products | (03) |
| 9. | Cement & their products | (05) |
| 10. | Timber | (03) |
| 11. | Miscellaneous Material | (16) |
| | | (30) |

CONTENTS:

GROUP - A (MECHANICAL ENGINEERING)

TOPIC: 01 – SIMPLE MACHINES **[06]**

Introduction to simple machines, M.A, U.R, & I] of simple wheel & Axle, Compound wheel & Axle, Screw jack, worm & worm wheel, Rack & pinion (simple numericals only)

TOPIC: 02 :- Introduction to ferrous & non ferrous metals **[05]**

Physical & mechanical properties & uses of ferrous metals & Alloys & non ferrous metals like, Al, Cu, Zn, & their alloys Properties & uses.

TOPIC: 03 :- GENERAL PROCESS

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|-------|---|-------------|
| 03.01 | Introduction to Soldering, brazing & welding. | [03] |
| 03.02 | Application of soldering, brazing & welding. | |
| 03.03 | Flame Cutting and Welding. | |
| 03.04 | Different types of flames used | |
| 03.05 | Safety precautions in Welding. | |

TOPIC: 04 - HEAT ENGINES & FLUID MACHINES

[06]

- 04.01 Introduction to External & Internal Combustion engines.
- 04.02 Difference between External & Internal Combustion engines.
- 04.03 Concept of Heat work and Energy. Thermodynamic system and their properties. (Introduction only)

- 04.04 Introduction of Two-stroke and four-stroke I.C. engine, their working principles. water wheel, Introduction to Impulse & reaction turbine ,(Pelton, francis & Kaplan Turbine, working Principle only.)

TOPIC: 05 - POWER TRANSMISSION

[07]

- 05.01 Power transmission by belt
- 05.02 Rope chain & geardrive
- 05.03 Open & cross belt drive
- 05.04 Relation between tight side & slack side tension
- 05.05 Centrifugal tension, simple & compound
- 05.06 Gear drive, gear train.

TOPIC: 06 – BOILERS(Steam Generators)

[03]

- 06.01 Classification of boilers - Fire tube & water tube boiler. Working principle of classification boilers,working principle of cochran boiler.
- 06.02 Boiler accessories & Mounting, their functions.

GROUP - B (ENGINEERING MATERIAL)

TOPIC: 07 - STONES:

[03]

- 07.01 Introduction of stones as engineering materials
- 07.02 Classification of Rocks, qualities, selection and uses of different types of stones in various engineering construction works.
- 07.03 List of tests on stones,
- Dressing of stones & quarrying of stones.

TOPIC: 08 - CLAY PRODUCTS:

[03]

- 08.01 Common Clay products, (Vitrified, Porcelain) their manufacture and application.
- 08.02 Uses of brick and characteristics of good bricks.

TOPIC: 09 - CEMENT & THEIR PRODUCTS

[05]

- 09.01 Lime:
 - Introduction , Manufacturing Process
 - Different types of limes & its applications,
- 09.02 Cement:
 - Introduction, Manufacturing process
 - Different types of cements, their ingredients and applications, grade of cements, storage of cement.

TOPIC: 10- TIMBER**[03]**

- 10.01 Classification of Timber
- 10.02 Characteristics of good timber
- 10.03 Introduction of seasoning of timber
- 10.04 Preservation of timber and its uses

TOPIC: 11 - MISCELLANEOUS MATERIALS**[16]**

- 11.01 Plastics:
 - Introduction, important commercial products of plastics used in engineering works
 - Types of plastics - Thermoplastic & Thermosetting, Epoxy Resins
- 11.02 Glass:
 - Types of glass
 - Composition of glass
 - Uses of glass as industrial material
- 11.03 Adhesive:
 - Types of Adhesive
 - Its ingredients and uses sealant & joints fillers
- 11.04 Rubber:
 - Characteristics of Rubber
 - Types and uses of Rubber
- 11.05 Available forms of Aluminum as structural cladding & partition
Different type of bar section & their uses.

Books Recommended:

- 1. Workshop Technology - By Hazare and Choudhary
- 2. Heat Engine - By Pandey & Saha
- 3. Engineering Material - By Banga & Sharma
- 4. Engineering Material - By Narang
- 5. इंजीनियरिंग पदार्थ - जनार्दन झा
- 6. Electrical Engineering - By Uppal
- 7. वैद्युत अभियांत्रिकी - डी.आर. नारायण