

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE, APRIL – 2020**

METALLURGY AND MACHINE TOOLS

[Maximum Marks: 75]

[Time: 2.15 Hours]

PART-A

(Answer *any three* questions in one or two sentences. Each question carries 2 marks)

- I. 1. What is meant by strain hardening?
2. List any four heat treatment processes.
3. Briefly explain Oblique cutting.
4. Define cutting speed in drilling.
5. Mention any two differences between shaper and a planer. (3 x 2 = 6)

PART-B

(Answer any *four* of the following questions. Each question carries 6 marks)

- II 1. Explain (i) Slip and (ii) Twinning.
2. Discuss the needs of heat treatment processes.
3. Explain the functions of cutting fluid.
4. Explain how taper turning is performed in a lathe by a forming tool.
5. Explain (i) counter boring and (ii) counter sinking.
6. How will you specify a milling machine?
7. Explain the working principle of a shaper with a neat diagram. (4 x 6 = 24)

PART-C

(Answer *any of the three units* from the following. Each full question carries 15 marks)

UNIT – I

- III (a) Discuss the cooling curve for pure iron. (7)
(b) Explain (i) Hardening and (ii) tempering. (8)

OR

- IV (a) Explain Eutectic and Eutectoid reactions in phase diagrams. (7)
(b) Explain any two methods for manufacturing metal powder with neat diagrams. (8)

UNIT – II

- V (a) Explain the tool signature for a single point cutting tool with neat sketches. (7)
(b) Explain the following (i) Steady rest (ii) Follower rest. (8)

OR

- VI (a) Explain the desirable properties of cutting fluids. (7)
(b) Explain centre lathe with a neat diagram and mark its parts. (8)

UNIT- III

- VII (a) Explain the twist drill nomenclature with a diagram. (7)
(b) Explain (i) rapid indexing and (ii) plain indexing. (8)

OR

- VIII (a) Explain slab milling, gang milling and straddle milling. (7)
(b) Explain any four tool holding devices in drilling machines. (8)

UNIT - IV

- IX (a) Explain the main parts of a slotting machine with a simple sketch. (7)
(b) Explain the automatic feed mechanism in shaper. (8)

OR

- X (a) Explain the hydraulic shaper mechanism with a neat diagram. (7)
(b) Explain a table drive mechanism used in planer. (8)

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