

B.TECH.
(SEM IV) THEORY EXAMINATION 2022-23
MANUFACTURING PROCESSES

Time: 3 Hours

Total Marks: 100

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. 2 x 10 = 20

- (a) Why machining allowance is provided in casting?
- (b) Differentiate between wire drawing and extrusion.
- (c) What is the difference between cutting tool and machine tool?
- (d) In a machining operation, doubling cutting speed reduces the tool life to 1/8th of original value. The exponent n of Taylor's tool life equation will be?
- (e) Differentiate between glazing and loading in grinding.
- (f) Explain friability in grinding.
- (g) Discuss the purpose of welding flux used in SAW process.
- (h) What are the various consumables used in arc welding processes?
- (i) How non-conventional machining differs from conventional machining process?
- (j) Why abrasives are not recycled in abrasive jet machining?

SECTION B

2. Attempt any three of the following: 10x3=30

- (a) Explain the purpose of riser in casting process. Also discuss the Caine's method used for riser design.
- (b) Show schematically the Merchant force circle in orthogonal cutting. Also drive the following shear angle relationship

$$(2\phi + \lambda - \alpha = \pi/2)$$

Where:

ϕ is the shear angle, λ is the friction angle and α is the rake angle.

- (c) Explain grade in the grinding wheel. Outline the grinding wheel specification by using the following marking of a grinding wheel:

“B-D-46-P-5-R-17”

- (d) Discuss the TIG & MIG welding in detail with the help of neat sketches.
- (e) What is water jet machining? Explain its working principle with the help of suitable diagram. Also, mention its applications.

SECTION C

3. Attempt any one part of the following: 10x1=10

- (a) Discuss the heat transfer during solidification of a casting of a pure metal with the help of temperature and distance diagram.
- (b) Differentiate between hot working and cold working. Also explain advantages of metal forming processes over other manufacturing processes.

4. Attempt any *one* part of the following: 10x1=10

- (a) What do you understand by tool wear? Explain crater wear and flank wear with the help of suitable diagram.
- (b) An HSS tool is used for turning operation. The tool life is 60 min when turning is carried out at 30 m/min. The tool life will be reduced to 2 min if the cutting speed is doubled. Find the suitable speed in RPM for turning 300 mm diameter so that tool life is 30 min.

5. Attempt any *one* part of the following: 10x1=10

- (a) Discuss various types of abrasives used for manufacturing of grinding wheels. Also differentiate between dressing and truing.
- (b) What is super finishing? Write short notes on Honing, Lapping and Polishing process.

6. Attempt any *one* part of the following: 10x1=10

- (a) Explain the working of Friction welding process with the help of neat sketch. Also give its advantages and limitations.
- (b) What is HAZ in arc welding? Discuss the phenomenon of weld decay in HAZ with the help of suitable diagram.

7. Attempt any *one* part of the following: 10x1=10

- (a) What does LASER stands for? Explain its working with neat sketch. How metal removal takes place by LBM?
- (b) In an ECM operation, a square hole of dimension 5 mm × 5 mm is drilled in a block of copper. The current used is 5000 A. Considering atomic weight of copper as 63 and valency of dissolution as 1, find the material removal rate in gram/sec. (Faraday's Constant = 96500 Coulomb)