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f/17MEA405

# Fourth Semester B.E. Degree Examination, Dec 19/Jan.2020
## Metal Casting and Welding

Time: 3 hrs. Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

1 a. Define pattern. What are the materials used for making pattern? Explain briefly. **(10 Marks)**
b. Sketch and explain Sand Slinger Moulding Machine. **(10 Marks)**

OR

2 a. Explain investment moulding process with necessary sketches. List its advantages and disadvantages. **(10 Marks)**
b. What are the functions of gating system? **(04 Marks)**
c. Explain with neat diagram blind riser. **(06 Marks)**

### Module-2

3 a. Sketch and explain Squeeze Casting process. **(10 Marks)**
b. Explain with a neat diagram coreless induction furnace. **(10 Marks)**

OR

4 a. Explain with a neat sketch cold chamber pressure die casting process. **(08 Marks)**
b. Sketch and explain continuous casting process. **(08 Marks)**
c. What are the advantages of semi centrifugal casting process? **(04 Marks)**

### Module-3

5 a. What are the solidification variables? Explain briefly. **(10 Marks)**
b. Explain briefly the methods of removing gases in liquid metal with neat sketch. **(10 Marks)**

**OR**

6 a. Sketch and explain the Stir casting process. **(08 Marks)**
b. List the advantages and disadvantages of aluminum castings process. **(08 Marks)**
c. Explain briefly Shrinkage defect. **(04 Marks)**

### Module-4

7 a. Explain with a neat sketch Tungsten Inert Gas (TIG) welding process. **(10 Marks)**
b. Explain with neat diagram resistance welding process. **(10 Marks)**

**OR**

8 a. Sketch and explain the laser welding process. **(08 Marks)**
b. What are the advantages, disadvantages and applications of electron beam welding process? **(08 Marks)**
c. Explain briefly the principle of welding process. **(04 Marks)**

### Module-5

9 a. What are the important effects of residual stress on welding process? **(04 Marks)**
b. Explain with a neat diagram oxy-acetylene welding process. **(08 Marks)**
c. Compare soldering, brazing and welding process. **(08 Marks)**

**OR**

10 a. Sketch and explain ultrasonic inspection method. Mention advantaes,anct_disadvantages of ultrasonic C inspection method. **(10 Marks)**
b. With a neat sketch, explain radiography inspection method. **(10 Marks)**

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# Fourth Semester B.E. Degree Examination;ifec.2 9/Jan.2020
# Machine Tools and Operations

Time: 3 hrs. Max. Marks: 100

***Note: Answer any FIVE full questions, choosing ONE full question from each module.***

## Module-1

I a. Define machine tool. Give the classification of machine tool. **(08 Marks)**

6 b. Explain with neat sketch working principle of horizontal milling machine. **(12 Marks)**

**OR**

**2** a. With neat sketch explain the working principle of center type cylindrical grinding machine. **(12 Marks)**

b. Explain with neat sketch, quick return mechanism of shaper. **(08 Marks)**

## Module-2

**3** a. Explain the various machining parameters involved during turning operation on lathe machine. **(08 Marks)**

b. Explain the following milling operations:
(i) Face milling (ii) Slab milling
(iii) Slotting (iv) Straddle milling **(12 Marks)**

**OR**

**4** a. With a neat sketch, explain principle of broaching process. **(05 Marks)**

b. Explain with example working motion for following machining processes:
(i) Shaping (ii) Planning (iii) Slotting
(iv) Drilling (v) Lathe **(15 Marks)**

## Module-3

**5** a. Explain the salient features of the following cutting tool materials:
(i) CBN (ii) Ceramics (iii) Cemented Carbides **(12 Marks)**

b. What are the properties of a good cutting fluid? **(08 Marks)**

**OR**

**6** a. What is meant by tool signature'? Explain each term of a tool designated as:
8 —12-10— 7-5-15-1.5 **(10 Marks)**

b. Find the machining time required for machining a surface 600 x 800 mm on a shaping machine. Assume cutting speed as 8m/min. The ratio of return to cutting stroke is 1:4 and the feed is 2 mm/double stroke. The clearance at each end is 70 mm. **(10 Marks)**

## Module-4

**7** a. Derive an expression for shear angle in terms of chip thickness ratio and rake angle for orthogonal cutting. **(12 Marks)**

b. What are the conditions favorable for built-up-edge formation'? **(08 Marks)**

**OR**

8 a. A 12 mm hole is to be drilled through a 20 mm thick plate. The cutting speed is 12 in/min and the feed rate is 0.12 mm/rev. Estimate the machining time. Take the over travel plus clearance of the tool as 5 mm. **Marks)**

b. The following details relates to an orthogonal cutting operation. Feed = 1.25 mm/rev, chip thickness = 2 mm, rake angle of tool = 10°. Calculate :

(i) Chip thickness ratio and shear angle

(ii) If the shear strength is 6000 kg/cm`, width of cut = 10 mm, cutting speed = 30 mpm and coefficient of friction = 0.9, determine the following:

(1) shearing force (2) friction angle (3) cutting force (10 **Marks)**

## Module-5

9 a. What is tool wear? Why does the tool fail during cutting? Explain giving reasons. **(10 Marks)**

b. Write short notes on Taylor's tool life equation. **(10 Marks)**

**OR**

10 a. List the cutting conditions which have an important influence upon metal cutting in machining. **(12 Marks)**

b. A 50 mm bar of steel was turned at 284 rpm and tool failure occurred after 10 min. The speed was changed to 232 rpm and the tool failed in 60 min of cutting time. What cutting speed should be used to obtain 30 mins of tool life? **(08 Marks)**