

Reg. No. \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FOURTH SEMESTER B.TECH DEGREE EXAMINATION, JUNE 2017**

Course Code: **ME 220**Course Name: **MANUFACTURING TECHNOLOGY (IE, ME, MA)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any three questions. Each question carries 10 marks.*

1. a. Name the purpose and significance of any *three* tests conducted on moulding sand. (6)  
b. Three pieces being cast have the same volume but different shapes. One is a sphere, one a cube, and the other a cylinder with height equal to its diameter. Which piece will solidify in the least time and which one will take the maximum time? Justify. (4)
2. a. What is directional solidification? (3)  
b. With a neat sketch, explain the working of a hot chamber die casting machine. (5)  
c. State the reasons for misrun and hot tear. (2)
3. a. What is cambering of rolls? Why is it required? (4)  
b. What is draftin rolling? Obtain an expression for maximum possible draft in terms of coefficient of friction between contact surface of rolls and work and the radius of the roll. (6)
4. a. Explain the process of ring rolling. (5)  
b. A 300 mm wide strip 25 mm thick is fed through a rolling mill with two powered rollseach of radius = 250 mm. The work thickness is to be reduced to 22 mm in one pass at a roll speed of 50 rev/min. The work material has a mean flow stress of 175.7MPa and the coefficient of friction between the rolls and the work is assumed to be 0.12. Calculate the roll force and power requirement. (5)

**PART B**

*Answer any three questions. Each question carries 10 marks.*

5. a. With the help of neat sketches, explain the differences between open die forging and closed die forging? (5)  
b. Describe the steps involved in impression die forging with a sketch. (3)  
c. What is the difference between fullering and swaging? (2)

6. a. Mention any three defects in forging and reasons for them. What are the design modifications that can be considered to avoid forging defects? (6)
- b. Define the term extrusion ratio. Discuss any three classification of extrusion. (4)
7. a. Define degrees of freedom with a neat sketch. What are the advantages of locating a workpiece? (3)
- b. Explain 3-2-1 principle using a suitable example. (4)
- c. Differentiate between locating from planes and locating from circular surfaces. (3)
8. a. Define the principles of clamping. Explain the various types of clamps used. (5)
- b. What are the differences between vacuum clamping and magnetic clamping? (5)

### PART C

*Answer any four questions. Each question carries 10 marks.*

9. a. Differentiate between blanking and punching (2)
- b. What is springback? What are its reasons and how can it be avoided? (5)
- c. What is rubber forming? (3)
10. a. What is deep drawing? What are its advantages? (3)
- b. What is spinning? Differentiate between conventional spinning and shear spinning. (4)
- c. Explain the process of stretch forming. (3)
11. a. Define weldability. What are the factors affecting weldability? (4)
- b. With the help of neat sketches, explain the metallurgy of a steel weld and the various regions in the weld. (6)
12. a. Compare leftward and rightward techniques used in gas welding. (5)
- b. When is a low pressure torch used in oxy-acetylene welding? How does it differ from an equal pressure torch? (5)
13. a. Define polarity in arc welding. How does it affect welding? How and why heat generated at electrode and workpiece vary according to polarity? (6)
- b. What are the important components in ultrasonic welding? Explain the process. (4)
14. a. Differentiate between friction welding and resistance welding. (3)
- b. What is the role of flux in brazing and soldering? (3)
- c. What are the different types of solders used in soldering? Give its characteristics. (4)

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