Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: IDD(B.Tech and M.Tech)**
Sub_Code: RME5C001

5th Semester Regular/Back Examination: 2024-25
SUBJECT: Basic Manufacturing Processes
BRANCH(S): MMEAM, MECH, ME
Time: 3 Hours
Max Marks: 100
Q.Code: R224

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) Sketch the cross-section of a sand mould that is ready for pouring and label the various important parts.
b) Discuss the consequences of pouring molten metal into the mould cavity at a rapid and slower rate.
c) Explain the function of chills and chaplets in casting.
d) What are the types of flames in oxy-acetylene welding? Which flame is extensively used and why?
e) What are the advantages of AC equipment over DC equipment in arc welding?
f) Distinguish the compaction and sintering process in connection with the powder metallurgy.
g) What is the “angle of byte” in rolling? On what factors does it depend?
h) What are the advantages of hot working over cold working of metals?
i) What is hydrostatic extrusion? List out its specific applications.
j) What is the basic principle of wire drawing? Name the factors affecting the wire drawing process.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Explain different types of pattern allowances and their purposes with suitable examples.
b) Discuss the composition of molding sand and the role of binders and additives in the molding process.
c) With a neat sketch, describe the operation of a cupola furnace.
d) Describe the TIG welding process and list its advantages over MIG welding.
e) Distinguish between brazing and soldering from the point of view of the filler metals used, applications, and the strength of the joint obtained.

f) Write a short note on laser-beam welding detailing the applications. Explain various types of lasers used in the laser-beam welding process.

g) Explain the basic principles of Powder Metallurgy. Discuss the steps involved in the process and its advantages and limitations.

h) Explain the working principle of ultrasonic welding and its industrial applications.

i) Discuss the concept of plastic deformation in metals. How do variables such as strain rate, temperature, and stress affect metal-forming processes?

j) Describe the process of deep drawing giving examples of products manufactured by this process.

k) With neat sketches differentiate between direct and indirect extrusion?

l) Provide a brief overview of explosive forming, coating, and deposition methods. How are these methods used in modern manufacturing?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What are the properties of molding sand? Explain how these properties are tested. Calculate the solidification time ratio for two steel cylindrical risers with dimensions 400 mm diameter by 800 mm height and 200 mm diameter by 400 mm height under identical cooling conditions. **(16)**

Q4 Discuss the common welding defects, their causes, and methods to prevent them. How can destructive and non-destructive testing be used to ensure weld quality? **(16)**

Q5 Describe the rolling and forging processes in detail. For rolling, explain the pressure and forces involved, the types of rolling mills, and common rolling defects. For forging, discuss Smith forging, drop forging, press forging, and machine forging, along with their respective advantages, disadvantages, and common forging defects. **(16)**

Q6 Write notes on: **(16)**

(a) Casting defects
(b) Resistance welding
(c) Electron Beam welding
(d) Forward and backward extrusion