



**ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)**  
ORGANISATION OF ISLAMIC COOPERATION (OIC)  
**DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING**

SEMESTER FINAL EXAMINATION  
IPE-4303 Manufacturing Process I

WINTER SEMESTER: 2022-2023  
TIME: 3 HRS  
FULL MARKS: 150

**There are 6 (SIX) questions. Answer all of them. Marks in the Margin indicate full marks.**

01. (a) Write down the working principle of Arc Welding Process and hence explain the following welding processes with necessary diagram.  
(i) Plasma Arc Welding Process  
(ii) Gas Tungsten Arc Welding Process. (5+5+5) (CO1, PO1)
- (b) Briefly explain the different types of welding defects showing causes and possible remedies. (10) (CO1, PO1)
02. (a) Explain with the necessary diagram the sand molding making procedure and hence the different mold sand compositions with required properties need to be specified that are required generally required in selecting molding materials. (13), (CO2, PO1)
- (b) Write down the working principle of crucible Furnace and Cupola Furnace used for melting of different types of materials. (6+6), (CO2, PO1)
03. (a) Explain the open die forging processes that can be used to produce different of parts with necessary diagram. If a solid cylindrical piece of diameter 100 mm with height 72 mm made of 304 stainless steel metal having the flow stress 1000 MPa is forged to reduce the height 60 mm. How the forging force can be calculated at the end of the stroke if the friction co-efficient is considered as 0.22? (7+6) (CO3, PO2)
- (b) If different types of electric sockets, light switches, automotive distribution caps are needed to be manufactured using a variety of plastics, which process need to be recommended? Explain the process description of recommended manufacturing technique(s) with the aid of necessary diagrams. (12), (CO3, PO2)
04. (a) Briefly explain with a simplified flow diagram powder metallurgy process and hence write down the working steps sequence of compaction procedure with the necessary diagram in powder metallurgy process. (7+6), (CO3, PO1)
- (b) Write down the differences between Thermoplastics and Thermosetting plastics with examples mentioning the properties and their applicability. (6+6), (CO3, PO1)
05. (a) List the various types of finishing operations and hence explain with their schematic illustration the working mechanism of (i) Lapping (ii) Honing operations. (6+6), (CO2, PO1)
- (b) How is the grinding wheel specified? Why are truing and dressing operations are necessary for grinding wheel? (6+7), (CO2, PO1)
06. (a) (a) Explain the different general design considerations that need to followed in casting process and explain the design sequence for optimum gating systems used in casting processes. (5+8) (CO1, PO1)
- (b) Classify the metal forming process and hence write down the working mechanism of the following processes with necessary illustrations of  
(i) Cluster Mill rolling, and  
(ii) Tube Drawing Processes. (4+4+4), (CO1, PO1)