Program: PhD/M.Sc.Engg./M.ScTE

Date: 23 May 2024
Time: 10:00AM to 1:00PM

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

SEMESTER FINAL EXAMINATION
MCE-6121 Advanced Topics in Manufacturing

SUMMER SEMESTER: 2022-2023
TIME : 3 HR 00 MIN
FULL MARKS : 150

There are 6 (Six) questions. Answer all Questions. Marks in the Margin indicate full marks

1(a) Explain with necessary flow diagram the methodological steps for the ensuring the correct approaches for Design of Manufacturing. (10)

(b) How the principles of concurrent engineering may be adopted in quality Function development approaches for different product development phases. (15)

2 (a) Explain the different strategies for the implementation of design of quality and hence the explain the poka-yoke principles for ensuring quality in product design. (12)

(b) What is composite material? Why composites are important? Write down the different structure of Fiber Reinforced Polymers, its properties and applications. (13)

3(a) List the different types of molding operations that are used to make composite materials and hence explain the following operations with necessary diagram. (14)

(i) Spray-Up method
(ii) Vacuum Bag molding

(b) What do you mean by Flexible manufacturing System? Explain the different dimensions of flexibilities of manufacturing with Examples. (11)

4(a) Classify the different manufacturing system based on automation. Explain briefly the features of different categories of flexible cells and system. (11)

(b) Explain the general integration architecture of an additive manufacturing machine. Write down the working principles of the following additive manufacturing processes with necessary schematic illustration. (14)

(i) Fused Deposition Modelling
(ii) Binder Jetting

5(a) Why non-conventional machining is required? Classify the different types of non-conventional machining and hence explain the working mechanism with necessary diagram of the following non-conventional machining processes mentioning the advantages, limitations and applications. (15)

(i) Ultrasonic Machining
(ii) Electro-Discharge Machining

(b) What is Group Technology (GT)? How the GT can be applied and implemented in any industries? (10)

6(a) Apply the rank order clustering technique to the part-machine incidence matrix in the following table to identify logical part families and machine groups. Parts are identified by letters and machines are identified numerically. (16)

	Parts								
Machines	A	B	C	D	E	F	G	H	I
1	1								1
2		1					1		
3			1		1			1	
4		1				1	1		
5			1					1	
6						1	1		
7	1			1					
8			1		1				

(b) What do you mean by SMED method? Explain briefly the different stages of implementing the SMED method and its effectiveness. (9)

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