



- Q. 6 a)** Explain with example the composite part concept. **(07)**
- b)** Apply the rank order clustering technique to 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 numbers: **(06)**

**Parts**

<b>Machines</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>
1	1	1		1				1	
2					1				1
3			1		1				1
4		1		1		1			
5	1							1	
6			1						1
7		1				1	1		

- Q. 7 a)** Define robot and explain following terms: **(07)**
- i) Work volume                      iv) Repeatability  
 ii) Spatial resolution                v) Speed of movement  
 iii) Accuracy
- b)** What is end effector? Explain different types of end effectors with neat sketches. **(06)**
- Q. 8 a)** Explain in detail, Micro EDM process with neat sketch. State its applications. **(07)**
- b)** What is Nano? Explain briefly the nano-manufacturing. **(06)**

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