Total No. of Questions : 10]

SEAT No. :

P2986

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[5154]-541

B.E. (Mechanical Engineering)

ADVANCED MANUFACTURING PROCESSES

(2012 Pattern) (Semester - I) (Elective - II) (End Semester)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***All questions are compulsory i.e. Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, and Q.9 or Q.10.***
2) ***Figures to the right indicate full marks.***
3) ***Assume suitable data, if necessary.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Explain with schematic stand-off technique of Explosive forming. **[4]**

b) State the advantages and limitations of vacuum die casting process. **[6]**

OR

Q2) a) Compare with schematic forward and backward flow forming processes. **[4]**

b) State applications of FSW in ship building, aerospace and railways, automotive and electrical industries. **[6]**

Q3) a) Classify micro-manufacturing processes in terms of type of energy used in these processes for machining. **[4]**

b) Explain with schematic the principle and steps that are to be followed during squeeze casting process. **[6]**

OR

Q4) a) Differentiate the Electro chemical grinding with conventional grinding. **[4]**

b) With a schematic explain the working principle and material removal mechanism of Electrolytic in-process dressing process. **[6]**

Q5) a) State the advantages and limitations of a diamond being used as a cutting tool material for ultra-precision micromachining. **[8]**

b) With a schematic explain the working principle of micro-electric discharge machining (μ-EDM). Also give the important peripherals or components of μ-EDM set-up. **[8]**

OR

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Q6) a) Using cause-effect diagram state the process parameters which influence the process performance of ultrasonic micromachining (USMM) process. **[8]**

b) State the process parameters of micro-electric discharge machining (μ-EDM) process which affect the oversize and aspect ratio. Also, differentiate micro-EDM process with electric discharge machining process. **[8]**

Q7) a) What is additive manufacturing? With a schematic describe the different steps by which a part or component is built in extrusion based additive manufacturing process. **[8]**

b) What is Direct Write technology (DW)? Classify Direct Write technology and explain any one of them with neat schematic. **[8]**

OR

Q8) a) Describe the process steps for manufacturing a component from design/ drawing stage to finished component using an additive manufacturing process. **[8]**

b) State with sketches the principle of Laminated Object Manufacturing (LOM) and Fused deposition Modeling (FDM). **[8]**

Q9) a) Online measurement of fine surface grooves having size in the range of few nanometers up to 200 μm is possible by using a focused laser beam using diffraction technique. Comment on the statement. **[6]**

b) With a schematic state the working principle of interference microscope. Also, state the applications of interference microscopy. **[6]**

c) State and explain the different imaging modes and contact scanning modes of Atomic Force Microscope (AFM). **[6]**

OR

Q10) Write short notes on following micro machining measuring instruments: **[18]**

a) Scanning tunneling microscope (STM)

b) Interference comparators

c) Surface profilers.