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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**(An Autonomous Institute Affiliated to AKTU, Lucknow)****B.Tech****SEM: IV - THEORY EXAMINATION (2022-2023 .)****Subject: Manufacturing Technology-II****Time: 3 Hours****Max. Marks: 100****General Instructions:****IMP:** Verify that you have received the question paper with the correct course, code, branch etc.**1.** This Question paper comprises of **three Sections -A, B, & C.** It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.**2.** Maximum marks for each question are indicated on right -hand side of each question.**3.** Illustrate your answers with neat sketches wherever necessary.**4.** Assume suitable data if necessary.**5.** Preferably, write the answers in sequential order.**6.** No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.**SECTION A****20****1. Attempt all parts:-**

- 1-a. Why metal removal process is costly? (CO1) 1
- (a) more energy is required
 - (b) some of the material is wasted
 - (c) both more energy is required and some of the material is wasted
 - (d) none of the mentioned
- 1-b. In which operation, motion of job is rotary and motion of cutting tool is forward translating? (CO1) 1
- (a) milling
 - (b) all of the mentioned
 - (c) planning
 - (d) turning
- 1-c. Wood working lathe is the type of ____ (CO2) 1
- (a) engine lathe
 - (b) bench lathe

- (c) speed lathe
(d) capstan lathe
- 1-d. Which type of machining can be done by milling machine? (CO2) 1
(a) cutting keyways
(b) slots and grooves
(c) gears
(d) all of the mentioned
- 1-e. Which of the following process has the lowest cutting speed? (CO3) 1
(a) Drilling
(b) Honing
(c) Milling
(d) Turning
- 1-f. Dwell is defined by: (CO3) 1
(a) G04
(b) G03
(c) G02
(d) G01
- 1-g. Non-Traditional machining is recommended when we need which of the following features? (CO4) 1
(a) Complex shapes
(b) High surface quality
(c) Low-rigidity structures
(d) All of the mentioned
- 1-h. In Abrasive jet machining, what may be the size of the abrasive grains used? (CO4) 1
(a) 10 – 40 μm
(b) 50 – 100 μm
(c) 100 – 150 μm
(d) 200 – 300 μm
- 1-i. When was the first significant development of ECM occurred? (CO5) 1
(a) 1920s
(b) 1930s
(c) 1950s

(d) 1960s

- 1-j. Cavities with which of the following factors can be produced using Electro discharge machining? (CO5) 1
- (a) Thin walls
 - (b) Fine features
 - (c) Thin walls & Fine features
 - (d) None of the mentioned

2. Attempt all parts:-

- 2.a. Write about any two cutting fluids? (CO1) 2
- 2.b. How are work pieces held in a shaper machine? (CO2) 2
- 2.c. Write the applications of abrasive jet machining? (CO3) 2
- 2.d. Name the abrasives used in USM process? (CO4) 2
- 2.e. Define ECM? (CO5) 2

SECTION B

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3. Answer any five of the following:-

- 3-a. Describe the forms of wear on the cutting tool with neat sketches? (CO1) 6
- 3-b. List the various type of chips formation and discuss the factor affecting them? (CO1) 6
- 3-c. Why is milling a versatile machining process? (CO2) 6
- 3-d. Write the differences between drilling and tapping? (CO2) 6
- 3.e. Write briefly about broaching machines and its operations with neat sketch? (CO3) 6
- 3.f. Explain the factors that should be considered during the selection of an appropriate unconventional machining process for a given job? (CO4) 6
- 3.g. Describe the chemistry involved in ECM process and explain the process parameters. (CO5) 6

SECTION C

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4. Answer any one of the following:-

- 4-a. An orthogonal cutting of steel is done with 10° rake tool, with a depth of cut 2 mm and feed rate of 0.20 mm/rev. The cutting speed is 200 m/min. The chip thickness ratio is 0.31. The vertical cutting force is 1200 N and the horizontal cutting force is 650 N. Calculate from the Merchant's theory, the various work done in metal cutting and shear stress. (CO1) 10

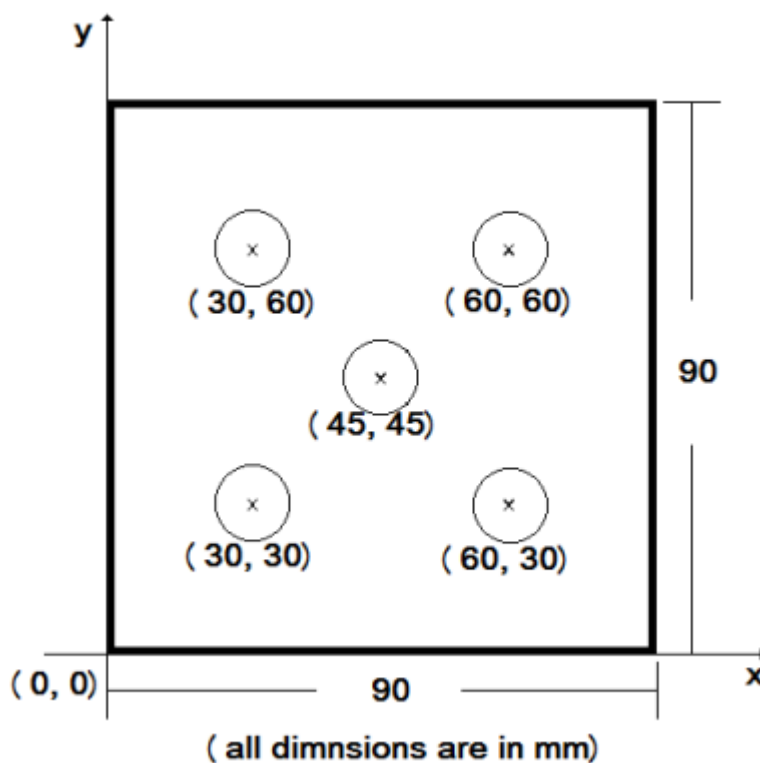
- 4-b. What do you mean by Tool life? Derive an expression to find the Tool life of a single point cutting tool? (CO1) 10

5. Answer any one of the following:-

- 5-a. Explain about gear generation and gear finishing process with suitable diagram? (CO2) 10
- 5-b. Describe the working of a surface milling machines? Also enlist the Advantages, disadvantages and applications of milling machines? (CO2) 10

6. Answer any one of the following:-

- 6-a. Explain with simple sketches the working principles and process parameters of honing process? (CO3) 10
- 6-b. Write a CNC part programme to drill 5 holes ($R\ 3\text{ mm}$) as shown in Fig.4 in an aluminium slab of 19 mm thickness and size 90 mm x 90 mm? (CO3) 10



7. Answer any one of the following:-

- 7-a. Compare and contrast the various unconventional machining process on the basis of type of energy employed, material removal rate, transfer media and economical aspects. (CO4) 10
- 7-b. A flat surface of 50 mm x 50 mm is to be machined using abrasive jet machining. The material to be machined is aluminum with a thickness of 10 mm. The abrasive used is silicon carbide with a grit size of 120 mesh. The 10

nozzle diameter is 1 mm, and the pressure of the air-abrasive mixture is 2.5 bar. The standoff distance is 2 mm. Determine the material removal rate and the time required to machine the flat surface to a depth of 1 mm. (CO4)

8. Answer any one of the following:-

- 8-a. Explain the process of PAM with a neat sketch. With respect to principle, equipment process parameter, advantages, disadvantages and applications. (CO5) 10
- 8-b. Explain the working principle of electrochemical discharge grinding and discuss the process capabilities and applications? (CO5) 10

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