KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.E.
Year : III

Course : MEEG 317
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date 29 JUN 2023

SECTION "A"
[20 Q. × 1 = 20 marks]

Encircle in the most appropriate option.

1. The parting line in injection molding is which of the following:
   a. Where two mold halves come together
   b. The narrow gate sections where the parts are separated from the runner
   c. Where the clamping unit is joined to the injection unit in the molding machine
   d. The lines formed where polymer melt meets after around a core in the mold

2. Which advantage is typically associated with a three-plate mold compared to two-plate mod?
   a. Weaker molded parts
   b. Sprue pin does not solidify
   c. Automatic separation of parts from runners
   d. Gating is usually at the base of the part to reduce weld lines

3. What is the term used to describe a thermoforming mold that has a convex form?
   a. A die
   b. A positive mold
   c. A negative mold
   d. A three –plate mold

4. For which of the following purposes is polystyrene, a light and transparent thermoplastic material commonly used?
   a. Toys and combs
   b. Packaging bags
   c. Electrical insulation
   d. Non-sticking utensils

5. Which of the following statements accurately describe metallic powders?
   a. The difference between porosity and packing factor is equal
   b. Packing factor =1 - porosity
   c. Packing factor = 1/porosity
   d. Packing factor = bulk density/true density

6. Hot Iso-static pressing process involves
   a. Compression of parts to increase density
   b. Mixing metal powders and production of alloy
   c. Production of intermediate and semi-finished parts
   d. Production of finished parts with high dimension accuracy

7. Which method is utilized to produce powder from metals that have a low melting point?
   a. Mechanical pulverization
   b. Chemical reduction
   c. Electrolytic process
   d. Atomization

8. The etch factor in chemical machining is equal to _____
   a. d/u
   b. u/d
   c. C/d
   d. CIt

9. Which process would be suitable for drilling a hole with a square cress section, measuring 0.25 inch on each side and 1 inch deep in a steel workpiece?
   a. Chemical milling
   b. Abrasive jet machining
   c. Laser beam machining
   d. Electric discharge machining

10. Which of the options below is **NOT** a mathematical method used to describe a curve?
   a. Laplace form
   b. Implicit form
   c. Explicit form
   d. Parametric form

11. When the curve passes through all the given points, then curve is known as _____
   a. Data curve
   b. Pitch curve
   c. Interplant curve
   d. Approximate curve

12. Which of the following statements describes the outcome of first-order continuity in curves?
   a. Position continuity is achieved
   b. Curvature continuity is achieved
   c. Slope continuity is achieved
   d. Independent continuous properties are achieved

13. Which transformation technique is responsible for changing the size of an object, either making it larger or smaller?
   a. Translation
   b. Rotation
   c. Shear
   d. Scaling

14. When a reelection in the line y = -x takes place, which of the following rules describes the transformation?
   a. (x, y) becomes (-y, -x)
   b. (x, y) becomes (y, x)
   c. (x, y) becomes (x,-y)
   d. (x, y) becomes (-x, y)

15. Which code is used in a CNC milling program when identical macros are required?
   a. G20
   b. G66
   c. G21
   d. G68

16. In a CNC milling machine, the program zero point refer to which of the following?
   a. The point where the coordinates of the X and Y axes meet.
   b. The point where the coordinates of the X, Y, and Z axes meet.
   c. The point where the coordinate of X only meets with the new program.
   d. The point relative to which all coordinate values in the program are referenced.

17. In APT program tool, specification of feed is associated with _____
   a. Set up statement
   b. Geometry statement
   c. Motion statement
   d. Post processor statement

18. The first five digits of the OPTIZ classification method, are _____
   a. Form code
   b. Secondary code
   c. Stationary code
   d. supplementary code

19. Which rapid prototyping technology employs solid sheet stock as the initial materials?
   a. Fused deposition manufacturing
   b. Elective laser sintering
   c. Laminated object manufacturing
   d. Droplet deposition manufacturing

20. What is the term used to describe a system that combines multiple technologies into a unified and coherent system?
   a. Portable manufacturing system
   b. Automated integration system
   c. Portable manufacturing system
   d. Flexible manufacturing system

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29 JUN 2023

Level : B.E.
Year : III
Time : 2 hrs. 30 mins.

Course : MEEG 317
Semester : II
F. M. : 55

SECTION "B"
[5Q × 11=55 marks]

Attempt *ANY FIVE* questions. Assume suitable data, if necessary.

1.
a. What is the blown-film process for producing film stock? [3]
b. Describe the features of an extruder screw use in plastic technology and comment on their specific functions. [4]
c. What determines the cycle time for (i) injection molding, (ii) thermoforming, and (iii) compression molding? [4]

2.
a. How nontraditional machine processes are classified? [2]
b. In an electrochemical Machining operation, the frontal working area of the electrode is 2.5 in^2. The applied current and voltage are 1500 amps, and 12 volts respectively. The material being cut is pure aluminum, whose specific removal rate is 0.000126 in^3/A-min. (a) if the ECM process is 90 percent efficient, determine the rate of metal removal in in^3/hr. (b) if the resistivity of the electrolyte is 6.2 ohm-in, determine the working gap. [5]
c. Explain with neat sketches, principal, need, equipment, operation, advantages and disadvantages of the photochemical machining process [4]

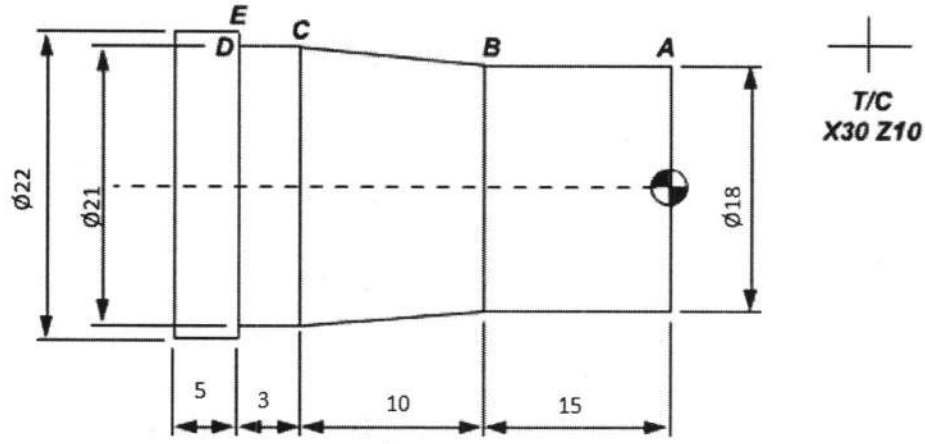
3.
a. What is powder metallurgy? Explain the advantages of blending different metal powder. [1 + 4 = 5]
b. A screen with 10 mesh count has wires with a diameter of 0.0213 in. Determine (a) the maximum particle size that will pass through the wire mesh and (b) the proportion of open space in the screen. [3 + 3 =6]

4.
a. List the important properties of a Bezier curve? [2]
b. Find A triangle having vertices (1, 10), (5, 2) and (8, 4) is translated by 3 units in y- direction then it is rotated by 45^0 in counter clockwise direction, then it is scaled by 3 Units in x direction, Find out final position of the triangle. [4]
c. Generate a Bezier curve using the following control points (2, 0) (4, 3), (5, 2) (4, -2), (5, -3) and (6, -2) [5]

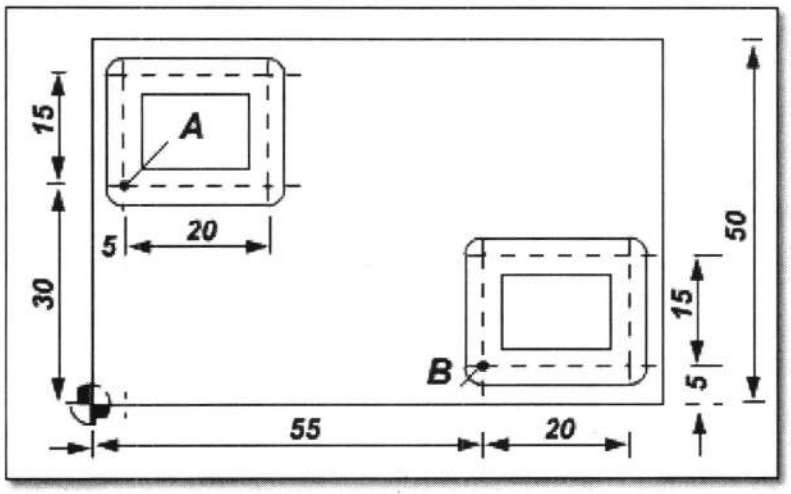
5.

a. What do you understand by word "Pocket milling" in CNC programming? [2]

b. Write a CNC Lathe part program for the following lathe work. Use Incremental Co-ordinate and assumed the program is only for final surface finish operation only. [4]



c. Write a CNC Milling part program manuscript for the following figures using a subroutine. The subroutine should complete the movement in a counterclockwise direction. (Instruction: The dimension of the work-piece are 80mm × 50 mm and start positions for subroutines are point A and B) [5]



6.

a. What types of (a) products and (b) production machines would not be suitable for FMC? What design or manufacturing features make them unsuitable? Explain with examples. [4]

b. Describe the RP technology called solid ground curing. [3]

c. Stereolithography is to be used to create a cone-shaped component. The cone has a height of 40 mm and a base radius of 40 mm. The layer thickness is 0.05 mm to reduce the staircase effect. The laser beam has a 0.22 mm diameter and travels across the photopolymer's surface at a speed of 1000 mm/s. Calculate an estimate for how long it will take to create the part assuming that 25 seconds are lost for each layer that the platform holding the part is lowered. Neglect the period after curing. The work setup will take 30 minutes. [4]