

KATHMANDU UNIVERSITY
End Semester Examination
August, 2018

Marks scored:

Level : B.E.
Year : III

Course : MEEG 317
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date AUG 08 2018

SECTION "A"
[20 Q × 1 = 20 marks]

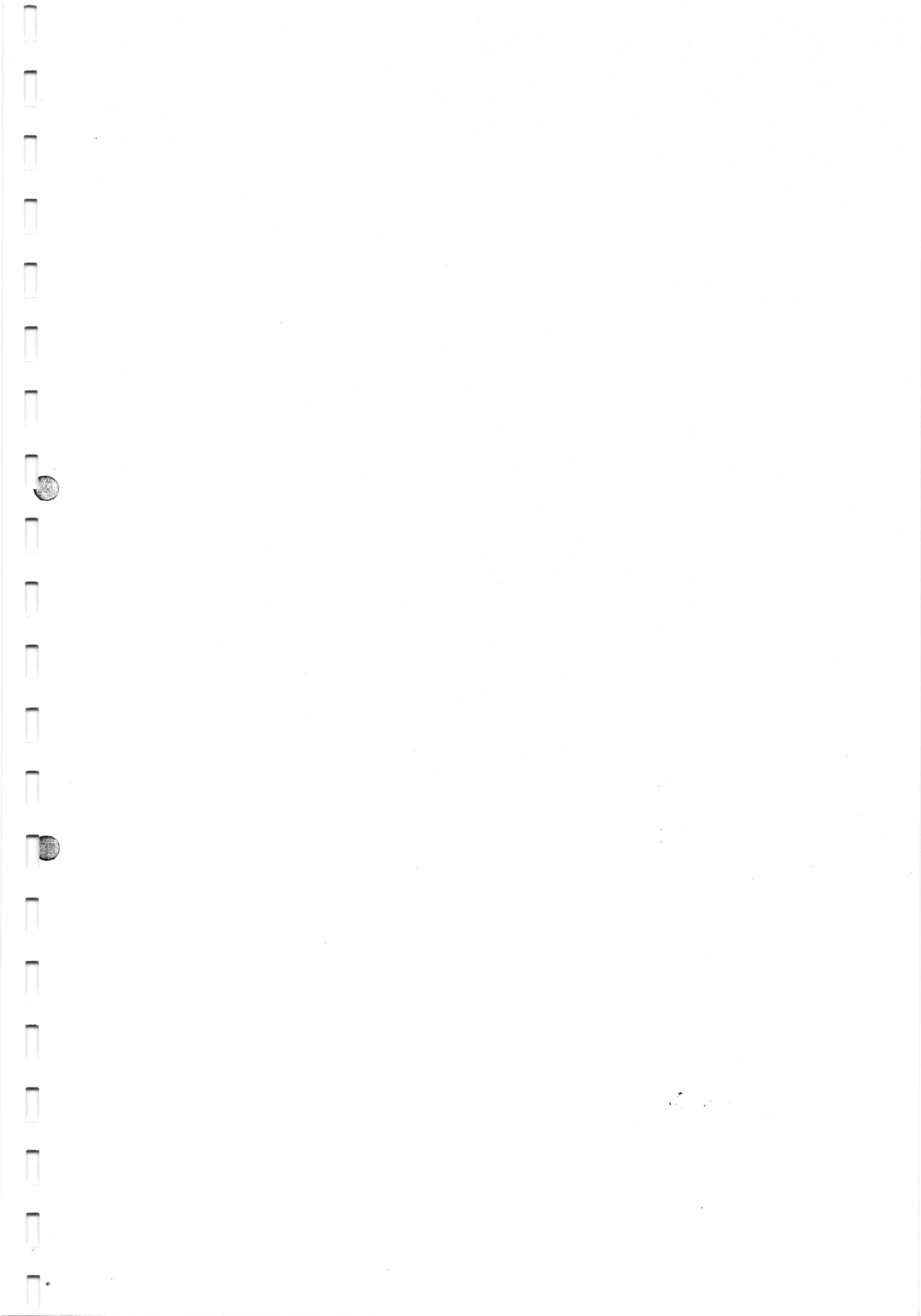
Tick the most appropriate answer.

1. Which Rapid Prototyping process uses scanning laser beam to cure a given layer
[a] Solid ground curing [c] Droplet deposition manufacturing
[b] Stereo lithography [d] Fused deposition modeling
2. Which of the following material removal process is used in non-traditional machining process
[a] Local melting [c] Local fusion
[b] Abrasion [d] All of above
3. Which of the following manufacturing process is applicable to non-conductive work-piece
[a] Electro chemical machining [c] Laser beam machining
[b] Electric discharge machining [d] Ultrasonic machining
4. Which of the following surface finishing process does not remove material from surface
[a] Buffing [c] Lapping
[b] Tumbling [d] Super finishing
5. Sintering process increases density of green compact up to
[a] 95 % [c] 75 %
[b] 85 % [d] 65 %
6. Which of the following method of powder production produces powders in alloy form:
[a] Electrolysis [c] Mechanical process
[b] Reduction [d] Atomization
7. Atomization Which process is performed with oscillation of tool at high frequency in abrasive slurry
[a] Electric discharge machining [c] Electron beam machining
[b] Ultrasonic machining [d] Electro-magnetic forming

8. Which of the following statement about Powder Metallurgy is true
 [a] About 97 % of the starting powders are converted to product
 [b] PM parts can be made with a specified level of porosity
 [c] Certain metals that are difficult to fabricate by other methods can be shaped by powder metallurgy
 [d] All of above
9. Which of the following condition is necessary to produce continuous chips
 [a] Large feeds and depths [c] Low cutting speeds
 [b] Ductile work materials [d] High tool chip friction
10. Which of the following represent the transformation for 90 degree rotation about origin
 [a] $\begin{vmatrix} x' \\ y' \\ 1 \end{vmatrix} = \begin{vmatrix} 1 & 0 & tx \\ 0 & 1 & ty \\ 0 & 0 & 1 \end{vmatrix} * \begin{vmatrix} x \\ y \\ 1 \end{vmatrix}$ [b] $\begin{vmatrix} x' \\ y' \\ 1 \end{vmatrix} = \begin{vmatrix} \cos(\theta) & -\sin(\theta) & 0 \\ \sin(\theta) & \cos(\theta) & 0 \\ 0 & 0 & 1 \end{vmatrix} * \begin{vmatrix} x \\ y \\ 1 \end{vmatrix}$
 [c] $[T] = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ [d] $[T] = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix} = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$
11. Explicit and Implicit type of curve falls under category of
 [a] Analytical curves [c] Space curves
 [b] Parametric curves [d] Synthetic curves
12. Which of the following process is used for finishing cylinders of IC engines
 [a] Buffing [c] Tumbling
 [b] Honeying [d] Super finishing
13. Wireframe Model of graphical display signifies
 [a] Representation of an object with topological information only
 [b] Representation of an object showing only the edges without any side surface in between
 [c] Representation of an object with topological information in addition to the geometrical information
 [d] Representation of an object with complete 3-D surfaces
14. Merchants Theory states that
 [a] The maximum shear stress occurs perpendicular to the shear plane
 [b] Increasing shear plane angle and hence make chip thicker
 [c] Shear angle adjust itself so as the cutting force is minimum
 [d] None of above

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15. Which of the following method is used by a Direct numerical control system
- [a] Controlling the movements of machine components by direct insertion of coded instructions in the form of numerical data
 - [b] Network consisting of central computer connected to machine tool MCUs
 - [c] Control multiple machine tools by a single computer through direct connection and in real time
 - [d] Minimize human involvement in decision making
16. Minimize human involvement in decision making Which of the following statement about the metal cutting is true
- [a] Approximately 98 % of the energy in machining is converted into heat
 - [b] Hottest point is in secondary shear zone, not the tooling point
 - [c] Primary mission of cutting fluids is to extend tool life
 - [d] All of above
17. Indirect Rapid tooling method uses
- [a] Rapid Prototyping technology to produce pattern of tools to be fabricated
 - [b] Rapid Prototyping technology to produce tools together with Powder Metallurgy
 - [c] Powder Metallurgy technology alone to produce tools
 - [d] Powder Metallurgy technology together with machining to produce tools
18. Hot Iso-static pressing process involves
- [a] Compression of parts to increase density
 - [b] Production of intermediate and semi-finished parts
 - [c] Production of finished parts with high dimensional accuracy
 - [d] Mixing of metal powders and production of alloy
19. Choose the correct statement about Flexible Manufacturing System
- [a] It is used to control of a process that responds to changes in the manufacturing operating conditions
 - [b] Similar parts are arranged into part families, where each part family possesses similar design and/or manufacturing characteristics
 - [c] Configured for a specific application, such as pattern recognition or data classification, through a learning process
 - [d] Set of numerically controlled machine tools and supporting workstations connected by an automated material handling system and controlled by a central computer
20. Which code represents circular interpolation in counter clockwise
- [a] G03
 - [b] G04
 - [c] G05
 - [d] G06



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

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

Instructions to the candidates:

1. Attempt any five questions.
2. Neat diagram must be drawn wherever necessary.
3. Assume suitable data, if necessary.
4. Figure to the right indicate full mark.
5. No additional handouts will be provided or allowed to carry

SECTION "B"

1. a. Identify application of non-conventional machining process in production technology. [3]
b. Explain theory behind the Electric Discharge machining process. [3]
c. Discuss process, tools, applications and limitations of Electro Chemical Machining. [5]
2. a. Compare Lapping, Honeying and Super Finishing processes in terms of their applications. [3]
b. Discuss the need and purpose of Rapid Prototyping Process in Manufacturing Technology. [3]
c. With diagram discuss the working principle and application of Selective Laser Sintering. [5]
3. a. List methods of production process of engineering powders and discuss one of them. [3]
b. Describe compaction process in powder metallurgy to produce highest density. [3]
c. Draw the overall process layout for production of artificial bones from powder metallurgy process, with brief descriptions of each steps. [5]
4. a. Discuss different types of forces involved in formation of chips. [3]
b. Discuss role of Merchant's equation in metal cutting process. [3]
c. Discuss different types of tool wear with methods to prevent them. [5]
5. a. Discuss different methods of coding used for part programming in CAM. [3]
b. Discuss different types of control systems used for operating machine tools in CAM. [3]
c. With appropriate reasons select the most suitable "system of manufacturing process" for production of Francis runner, also explain the steps involved. [5]
6. a. Discuss role of curve fitting and curve faring to generate the solid models in CAD. [3]
b. Show that the following transformation matrix gives a pure rotation [3]

$$[T] = \begin{bmatrix} \frac{1-t^2}{1+t^2} & \frac{2t}{1+t^2} \\ -2t & \frac{1-t^2}{1+t^2} \\ \frac{1+t^2}{1+t^2} & \frac{1+t^2}{1+t^2} \end{bmatrix}$$

c. Discuss different methods of surface representations used in CAD, with their applications. [5]

OR

Write G-Code part programming to cut following shape in given work piece of diameter 100 mm. Assume necessary machining data. [5]

