Mechanical

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY
LONERE – RAIGAD – 402 103
End Semester Examination – December – 2017

Branch: M.Tech. (MEP/ME/MPE/Production) **Semester: I**

Subject with Subject Code: Theory of Machining (MMF101) **Marks: 60**

Date: 12 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram, etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

(Marks)

Q.1. Solve any Two of the following: **(6×2=12M)**

(a) In a face milling operation the back engagement is 5 mm, the work feed speed is 0.65 mm/sec, and the working engagement (width of workpiece) is 50 mm. The cutter has a diameter of 100 mm and has 20 teeth. If the cutting speed is to be 1 m/sec, Calculate 1. RPM of the milling cutter, 2. Material Removal Rate (MRR).

(b) Define the following:

1. Cutting speed
2. Undeformed chip thickness in Turning
3. Transient surface in Turning

(c) Derive the expression correlating the cutting speed with the chip speed in single point turning operation.

Q.2. Solve any Two of the following: **(6×2=12M)**

(a) Why do we measure the cutting forces? Write at least three purposes. During turning a ductile alloy by a tool of orthogonal rake of 10°, the forces found are P_z= 1000 N, P_x= 400 N. P_y= 300 N and chip reduction coefficient as 2.5. Evaluate using the Merchant circle diagram the values of F, N, frictional coefficient as well as P_s and P_n for the above machining.

(b) List the various methods of measurement of cutting temperature. Describe with a neat diagram the method of thermocouple for measuring the temperature in machining.

(c) Derive the expression for surface roughness of a machined part produced in turning operation using a nose radius tool.

Q.3. Attempt the following: **(6×2=12M)**

(a) What are the problems associated with the use of cutting fluids? How do you overcome these problems? Write any three measures. List the various methods by which the cutting fluids are applied in the machining region.

(b) Write the modified Taylors Tool life equation. Explain with neat diagrams the effect of federate, clearance angle and nose radius on the tool life.

Q.4. Attempt any one of the following: **(12×1=12M)**

(a) Derive the expression for cutting speed that gives maximum production rate. Write the suitable assumptions and define the terms used in the expression.

(b) Discuss how the choice of feed rate influences the economics of machining process.
In an attempt to appraise the cost-cutting speed relationship, the following three tests were conducted:

Test 1	V_1=85 m/min	C_p = 2.25
Test 2	V_2=125 m/min	C_p = 1.80
Test 3	V_3=170 m/min	C_p = 2.00

Assuming a parabolic relationship, write an equation that describes the operation between the given points.

Q.5. Solve any two of the following. **(6×2=12M)**

(a) What is Grinding Ratio? Explain with a neat sketch the mechanism of chip formation, plowing and rubbing in grinding operation.

(b) What are the mechanisms of grinding wheel wear? Explain each one with simple sketch.

(c) Define the following in grinding process:

1. Creep feed grinding
2. Geometric contact length
3. Mean uncut chip thickness

Q.6. Solve any two of the following: **(6×2=12M)**

(a) How does the abrasive water jet machining process works? Show schematic of the AWJM set up and labels the major components.

(b) Write the advantages and limitations of Electro-chemical machining. At least four each.

(c) Briefly discuss the following:

1. Surface integrity parameters
2. Undercut in chemical machining
3. Kerf with in Wire EDM

Dr. Babasaheb Ambedkar Technological University Lonere

Department of Mechanical Engineering

End Semester Examination (Dec-17)

M.Tech. Manufacturing Engineering

Subject code: MMP102/MMF102/MPE102

Semester: I | Subject: CNC Technology | **Max. Marks: 60**

Instructions:

- *Solve ANY FIVE questions out of the following.*
- *Assume suitable data wherever necessary and mention it clearly.*

Q.1 A Explain Classification of CNC machines based on feedback system with their relative advantages limitations and applications. **06 Marks**

B Explain the standard 'NC procedure'. **06 Marks**

Q.2 A Explain linear and rotary encoders with their applications in CNC machines. **06 Marks**

B Explain the basic components, advantages, limitations and applications of pneumatic drive for CNC machines. **06 Marks**

Q.3 A Explain various types of tool magazines with suitable sketches. **06 Marks**

B Explain the working and advantages of 'collate' and 'externally expanding mandrel' as work holding device on CNC tuning center. **06 Marks**

Q.4 Write a NC part program for finishing of a casting as shown in fig. 1 on a CNC machining centre. All the dimensions are in mm.

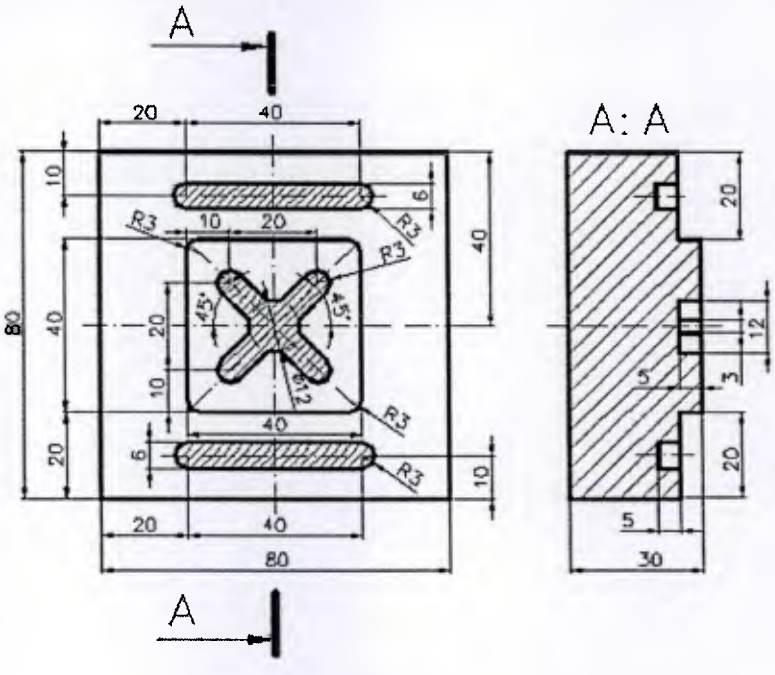

Fig. 1

12 marks

OR

Q.4 Write NC programme for turning of the job shown in fig. 2. All dimensions are in *mm*. Assume the raw material size of 65 mm diameter and 105 mm length.

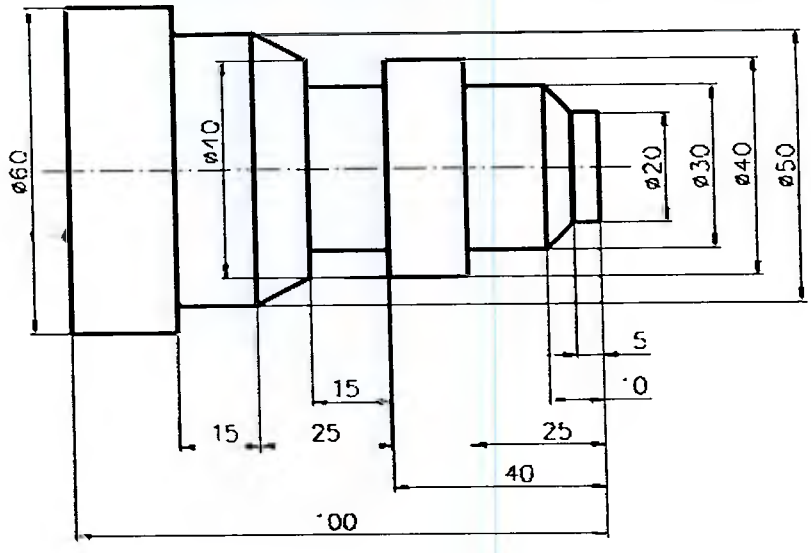

Fig. 2 12 Marks

Q.5 A What is the need of post processing while generating the NC program using a CAM software. **06 Marks**

B Enlist the precautions during automated NC program generation using a CAM software 06 Marks

Q.6 A Explain the following terminologies with suitable sketches with respect to free form machining.

1. Synthetic surface
2. Cutter contact point (CC point)
3. Cutter location point (CL point)
4. Scallop height **08 Marks**

B Explain how utilization of CNC machines can be improved. **04 Marks**

******** END OF PAPER ********

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD – 402 103
Winter Semester Examination – December – 2017

Branch: M. Tech (Manufacturing Engineering) **Semester: I**

Subject with Subject Code: Advanced Joining Technology [MMF103] **Marks: 60**

Date: 16 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

(Marks)

Q.1. Answer the following questions: **(12)**

A] What is the heat source in the 'oxyacetylene welding'? Explain the chemical reaction and 'neutral flame' supplying heat in this process. **(6)**

B] What is the effect of power density of heat source on heat input required for welding? Explain by considering gas welding, arc welding and laser beam welding processes. **(6)**

Q.2. Answer the following questions: **(12)**

A] Briefly explain the significance of the following laser beam parameters: **(6)**

i. Beam Power
ii. Laser Wavelength
iii. Shielding & Shrouding Gases

B] What is diffusion bonding? Explain the four metallurgical stages occurring during diffusion bonding process. **(6)**

Q.3. Answer any two of the following questions: **(12)**

A] Why pulsed – GMAW process has been introduced? **(3)**
What is 'percentage overlap' with reference to pulsed laser welding? **(3)**

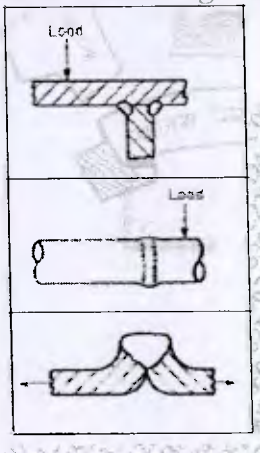
B] Draw pulse energy versus pulse duration plot for laser welding and show the following zones: **(6)**

i. Appropriate zone
ii. Cutting effect zone
iii. Incomplete penetration zone

C] Explain the following methods used for joining ceramic: (6)

i. Microwave Joining
ii. Transient Liquid Phase Bonding

D] Following figures shows non recommended weld designs. Redraw the figures by considering the recommended weld designs for getting high weld strength. (6)



Q.4. Answer the following questions: **(12)**

A] What are the main reasons for the development of residual stresses in welded structure? What are the stress relieving methods? (6)

B] Schematically show the following grains formation in weld pool microstructure. (6)

i. Planar growth
ii. Cellular growth
iii. Cellular dendrite growth
iv. Columnar dendrite growth

Q.5. Answer the following questions: **(12)**

A] What are welding codes? Mention name of any two international agencies providing recognized codes. (4)

B] Write short notes on the following non destructive testing methods:

i. Penetrant Testing (4)
ii. Magnetic Particle Testing (4)

Q.6. Answer the following questions: **(12)**

A] Explain the role of adhesion, cohesion and transition zone in giving strength to the required adhesive bond. (6)

B] Explain schematically 'furnace brazing' and 'dip brazing'. (6)

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD – 402 103
Winter Semester Examination – December – 2017

Branch: M.Tech. (Mechanical Production Engg. / Manufacturing Engg.) **Semester: I**

Subject with Subject Code: Quality Control and Reliability [MMF104H] **Marks: 60**

Date: 18 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

(Marks)

Q.1. (a) Define TQM?. Enlist and explain in detail the six basic concepts of TQM. **[4]**

(b) How the Juran's Tribology approach for managing quality is carried out? Explain in details. **[4]**

(c) Explain in detail Philip B. Crosby's four absolutes of quality management. **[4]**

Q.2. (a) Enlist and explain Deming's Philosophy of 14 points principles. **[6]**

(b) Explain in detail Philip B. Crosby's fourteen steps for quality improvement. **[6]**

Q.3. (a) Explain the following terms: (i) Measures of central tendency, (ii) Measures of dispersion **[6]**

(b) Determine the average, median, mode, range and standard deviation for the height of seven people. Data are 1.83, 1.91, 1.78, 1.80, 1.83, 1.85, 1.87 meters **[6]**

Q.4. (a) Explain QFD in detail. What are the benefits of QFD. **[6]**

(b) Write short notes on: (i) Weibull Analysis, (ii) Six Sigma **[6]**

Q.5. (a) Explain in detail Taguchi Design Approaches. **[6]**

(b) **[3]**

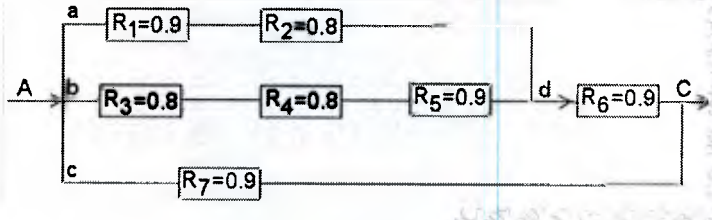
(i) Determine the S/N ratio for a process that has a temperature average of 21°C and a sample standard deviation of 2°C for four observations.

(ii) A head- stuffing procedure is comparing the caloric content of the original process with a new process. Which has the lower content and What is the difference? **[3]**

Original	130	135	128	127
Light	115	112	120	113

Q.6. (a) Define reliability? Explain in detail about bath tub curve used in reliability engineering? **[6]**

(b) Calculate the system reliability for the given complex series/parallel system. **[6]**



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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD – 402 103
Winter Semester Examination – December – 2017

Branch: M. Tech. (Mechanical / Production / Manufacturing) **Semester: I**

Subject and Code: Processing of Advanced Materials [MMF104I] **Marks: 60**

Date: 26 / 12 / 2017 **Time: 3 Hrs.**

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Instructions to the Students:

1. Each question carries 12 marks.
2. Attempt any five questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.

Q.1. Explain in brief nonferrous alloy? Distinguish nonferrous over ferrous alloys. Give the classification of nonferrous alloys and their properties and application in detail. **(12)**

Q.2.

a) What is Polymer? Give its properties and application. **(06)**

b) Explain Properties and application of Nickel alloys. **(06)**

Q.3.

a) What is Composite material? What are the basic features of composite material that influence and determine its properties? **(06)**

b) What are some of the limitation that may restrict the use of composite in engineering application? **(06)**

Q.4. Explain in detail nontraditional machining used for composite materials and what are the advantage over traditional machining? **(12)**

Q.5.

a) What are methods used for Processing of Polymers. **(06)**

b) Explain with neat sketch working and principle of EDM. **(06)**

Q.6.

a) Write a short note on LBM. **(06)**

b) Explain with neat sketch Plasma machining. **(06)**

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