Dr. Babasaheb Ambedkar Technological University Lonere-Raigad
Winter Semester Examination: Dec. 2019

M. Tech. in Manufacturing Engineering   Sem.: I
Subject: Metal Forming Processes   Marks: 60
Date: 11/12/2019   Time: 3 hours

Instructions: 1. Attempt ANY FIVE questions.
         2. Assume suitable data wherever necessary and mention it clearly.
         3. Write your specific instruction, if any.
         4. Each question carries 12 marks.

Que. 1 How the theory of plasticity plays the important role on the manufacturing processes? Explain few applications related to the forming processes. Explain the yield criteria for the same.

Que. 2 What is meant by Bulk forming? Explain any suitable forming process based on the bulk forming. Differentiate Hot, cold and warm working.

Que. 3 What are the different analytical techniques for metal forming processes? Explain the forging, extrusion and wire drawing processes.

Que. 4 How will you select the suitable dies and tools for the forging process? Explain various forming tools.

Que. 5 Write a detailed note on: a) Design of rolls for rolling   b) Design of rolls for forging

Que. 6 What do you understand by: Isothermal forging and near net shape manufacturing? Explain the current need of the forming processes as per the industrial application point of view.

END OF QUESTION PAPER

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

End Semester Examination December 2019

M. Tech. (Mfg)   Semester:- I

Sub.: Theory of Machining (TOM) (MME 11)   Marks: 60

Date: 10/12/2019   Duration:03 Hours

Instructions to the Student:

1. All questions are compulsory, however there are internal choice among them.
2. Clearly mention the main question number along with the sub questions.
3. If any data is missing, assume appropriate data and mention it in the answer sheet.

Q. No.	Question	Marks	CO	BT
1a	Differentiate between cutting speed and cutting velocity. Write any four points.	2	CO1	Recall
	A peripheral milling operation is performed on the top surface of a rectangular workpart which is 400 mm long by 60 mm wide. The milling cutter, which is 80 mm in diameter and has five teeth, overhangs the width of the part on both sides. Cutting speed = 70 m/min, chip load = 0.25 mm/tooth, and depth of cut = 5.0 mm. Determine (a) the actual machining time to make one pass across the surface and (b) the maximum material removal rate during the cut.	4	CO1	Apply
	OR			
1a	Explain the Piaaspanen model of card analogy in ductile chip formation.	2	CO2	Understand
	A drilling operation is to be performed with a 12.7 mm diameter twist drill in a steel workpart. The hole is a blind hole at a depth of 60 mm and the point angle is 118°. The cutting speed is 25 m/min and the feed is 0.3 4 mm/rev. Determine (a) the cutting time to complete the drilling operation, and (b) metal removal rate during the operation, after the drill bit reaches full diameter.	4	CO1	Apply
1b	Write the various factors that affects the cutting process.	2	CO2	Recall
	Mention how they influence the performance variables in metal cutting.	2		
	Differentiate between orthogonal cutting and oblique cutting. At least four points each.	2	CO2	Understand
2a	Name and briefly describe the four types of chips that occur in metal cutting.	2	CO2	Recall
	In an orthogonal cutting operation, the rake angle = -5°, chip thickness before the cut = 0.2 mm and width of cut = 4.0 mm. The chip ratio= 0.4. Determine (a) the chip thickness after the cut, (b) shear angle, (c) friction angle, (d) coefficient of	4	CO3	Apply

	friction, and (e) shear strain.			
2b	Show with a neat sketch the idealized stress distribution on rake face.	2	CO3	Recall
	Derive the kronenberg's equation which correlates coefficient of friction with the chip reduction coefficient.	4	CO3	Understand
3a	How the cutting tool fails? Write the criteria that is used by the industry for measurement of tool life.	2	CO3	Recall
	In an orthogonal cutting operation, the cutting velocity is 30 m/min and the chip velocity is 15 m/min. If the rake angle of the tool is 10°, calculate the shear angle and shear velocity.	4	CO2	Apply
3b	Why do we measure the cutting forces? List the different instruments used for measurement of cutting forces.	3	CO3	Recall
	Explain how the temperature in cutting zone is measured using tool-work thermocouple.	3	CO3	Understand
4a	Derive the relationship that correlates the minimum production cost with the cutting speed using graphical method.	6	CO4	Understand
4b	Write the properties of a good cutting fluid. How are cutting fluids classified? Explain.	3	CO4	Recall
	What is unit event in machining? Explain turning process surface integrity.	3	CO4	Understand
	OR			
4b	What are the grinding process parameters that are of interest?	2	CO5	Recall
	Explain their effects on the grinding performance and the wear rates.	4	CO5	Understand
5a	Briefly explain the working of an USM machine by showing important elements in a neat sketch.	6	CO6	Understand
5b	Write the difference between AJM and AWJM. Any four. Also discuss in brief the similarities in them.	6	CO6	Understand
	OR			
5b	What are functions served by dielectric fluid in EDM? Briefly explain the flushing techniques used in EDM, giving their relative merits.	6	CO6	Recall Understand

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
## Winter Semester Examination – December - 2019

Branch: M.Tech. Manufacturing   Sem.:- I
Subject:- CNC Technology (MME12)   Marks: 60
Date:- 12/12/2019   Time:- 3 Hr.

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) Classify CNC systems based on various criteria.   (06)
      b) Explain hardware's of CNC machine tool.   (06)

Q.2. a) Illustrate the function of interpolators used in CNC machine.   (06)
      b) Explain functions of feedback device.   (06)

Q.3. a) Explain working of APC and ATC with neat sketch.
         Also enlist advantages of both.   (06)
      b) Explain advanced features of CNC systems.   (06)

Q.4. a) Write the part program for following component. Assume suitable cutting conditions and cutting tools. The diameter of the work piece is 60mm.

                                                  (06)
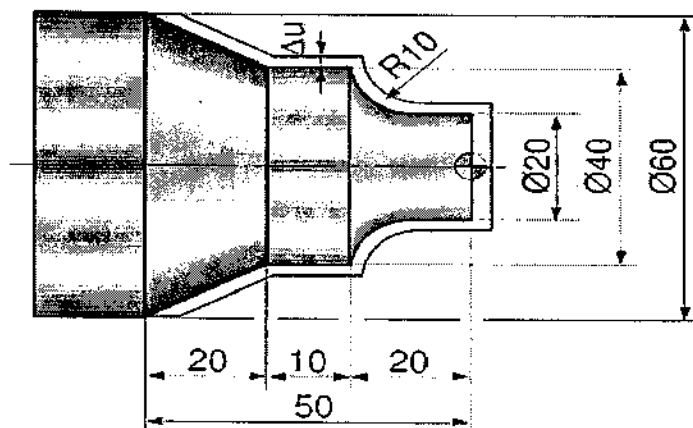
      b) Explain open loop and closed loop control system.   (06)

Q.5. a) Illustrate the concept of graphing proving.   (06)
     b) Explain the steps involved in computer assisted part programming. (06)

Q.6. Solve any **four** of the following   (4x3)
     a) What are the objectives of CNC equipment maintenance?
     b) Explain preventive maintenance of CNC.
     c) Identify role of stepper motor.
     d) Explain frequently required preparatory codes and miscellaneous codes.
     e) What is free form surface machining?
     f) Identify role of post processor.

_____ **Paper End** _____

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD – 402 103
Winter Semester Examination – December – 2019

Branch: M. Tech Mechanical Engineering Heat Power   **Semester: II**
Subject:- Fluid Dynamics –MTE22   **Marks: 60**
Date: 13/12/2019   **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.

1. Solve all the questions.

A. Explain the concept of continuum in fluids and stress in continuum.   (06)

B. The velocity vector in a fluid flow is given by $V=4x^3i-10x^2yj+2tk$. Find the local and convective acceleration components at the point (2,1,3) at time t=1. (06)

2. Solve all the questions.

A. The velocity potential function is given by $\varphi=5(x^2-y2)$. Calculate the velocity components at the point P(4,5).   (04)

B. Derive the continuity equation for a 3dimensional, steady, incompressible flow in Cartesian co-ordinates with a neat sketch.   (08)

3. Solve the following.

A) Derive exact solution of Navier stokes equation for a parallel fluid flow in a straight channel.   (12)

(OR)

B. i) Differentiate a) Steady flow & unsteady flow ; b) Uniform and non- uniform flow.   (04)

ii) Two infinite plates are h distance apart. There is a fluid of viscosity μ between the plates and the pressure is constant. The upper plate is moving at speed U= 5.5 m/s. The height of the channel h=2.2 cm. Calculate the shear stress at the upper and lower walls if μ = 0.55 kg/m.s and ρ = 950 kg/m^3. (04)

iii) Write a note on theory of hydrodynamic lubrication. (04)

4. Solve all the questions.

A. Explain the various regions of boundary layer with a neat sketch and the significance of boundary layer in a fluid flow. (04)

B. Air at 300 K flows over a flat plate at a speed of 3.2 m/s. Calculate the boundary layer thickness at distances 0.1 and 0.4 m from the leading edge of the plate. Also calculate the mass flow within the boundary layer at x= 0.1 and x= 0.4 m. The density and viscosity of air are 1.17 kg/m^3 and 1.85 x 10^{-5} kg/ms respectively at 300 K. (08)

5. Solve all the questions.

A. "Prediction and control of turbulence is an important engineering design activity". Comment and justify the above statement. (06)

B. Write in brief 1) Prandtl's mixing length hypothesis and
2) Karman's velocity defect law. (06)

6. Solve all the questions.

A. Compare the velocity profile of turbulent and laminar flow in a pipe. (04)

B. Derive the equation for turbulent or Reynold's shear stress. (04)

C. Calculate the Mach number at a point on a jet propelled aircraft, which is flying at 1100 km/hr at sea level where air temperature is 20 °C. Consider k= 1.4 and R = 287 J/kg K (04)

_____ Paper End _____

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
Winter Semester Examination – Winter2019

Branch: M. Tech (Manufacturing Engineering)   **Sem.:** I
Subject: Advanced Joining Technology   MME13/MME1202   **Marks:** 60
Date: 17/12/2019   **Time:** 3 Hrs.

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Instructions to the Students
1. Each question carries 20 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   Attempt the following (12)

a)   Consider the following spectrum of heat intensities used for fusion welding.
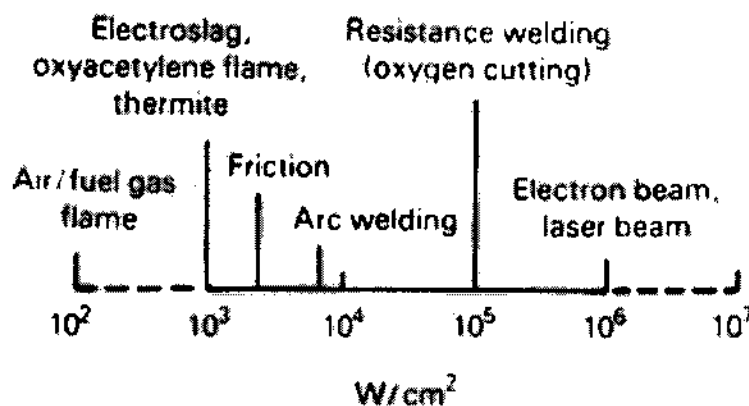
Explain the effect of these heat intensities on
1. Maximum weld travel velocity (4)
2. Heat affected zone width (4)

b)   Explain the Thermit Welding process. (4)

Q. 2   Attempt the following (12)

a) Explain the effect of following operating parameters on the laser welding process,
1. Focal point position (3)
2. Shielding gas (3)

b) Briefly explain any Ultrasonic Welding process. (6)

Q.3. **Answer the following questions,** (12)

A] Write a short note on the methods of welding plastics. (6)

B] Explain different joint designs. (6)

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

A] Explain the metallurgical changes occurring during typical welding process. (6)

B] Write short note on heat treatments of welded joints. (6)

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

A] Explain the failure modes of welded joints? (6)

B] Explain the Magnetic Particle Testing method of non destructive testing of welded joints (6)

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

A] Explain in detail the adhesive bonding method of joining. (6)

B] Explain the brazing and soldering process. (6)

_____ **Paper End** _____

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103
Winter Semester Examination – December - 2019

Branch: M Tech Manufacturing Process   Sem.:-I
Subject with Subject Code:- Quality Control and Reliability MME14A   Marks: 60
Date:- 19/12/2019   Time:- 3 Hr.

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) Explain Demings approach to mana	(6)
b) What are the consequences of Total Quality Management?	(6)
Q.2. a) Explain Crosby's fourteen steps for quality improvement.	(6)
b) What are kaizen management practices?	(6)
Q.3. a) What is Design of Experiments? Explain factorial experiments.	(6)
b) What are the basic techniques of statistical analysis? Explain any one?	(6)
Q.4. a) What is Control Chart? Give its significance.	(6)
b) Explain Quality Function Deployment.	(6)
Q.5. a) What is Statistical Process Control	(6)
b) Explain Taguchi's Approach to Experimental Design	(6)
Q.6 a) What are operating characteristic curves	(6)
b) What is reliability and life testing?	(6)

_____ Paper End _____

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD – 402 103
Winter Semester Examination – Dec – 2019

Branch: M. Tech. (Mechanical Engineering)   Sem.: II

Subject: - Research Methodology (MOE25A)   Marks: 60

Date: - 20/12/2019   Time: 3 Hrs.

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. Briefly describe the different steps involved in a research process?   **(12)**

Q.2. How would you differentiate between simple random sampling and complex random sampling designs? Explain clearly giving examples.   **(12)**

Q.3. How will you differentiate between descriptive and inferential statistics? Describe the important measures used to summarise the data.   **(12)**

Q.4. Write a short note on sampling error and central limit theorem.   **(12)**

Q.5. Explain the meaning of analysis of variance. Describe briefly the technique of analysis of variance for one way and two way classification.   **(12)**

Q.6. What do you mean by multivariate analysis? Explain how it differ from bivariate analysis.   **(12)**

_____ Paper End _____

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE - RAIGAD -402 103
Winter Semester Examination - Dec. - 2019

Branch: M . Tech Manufacturing.   **Sem.:- I**
Subject:- Manufacturing Planning and control MMECH15A   **Marks: 60**
Date:- 21/12/2019   **Time:- 3 Hr.**

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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

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Q.1. a) Define "manufacturing system". What are different manufacturing systems, their characteristics and applications? **(6)**

b) Select a manufacturing system for a two wheeler assembly shop producing 5000 units per day [2 shift working] with five models. Given model mix is model A – 10 %, model B-30%, model C – 15% , model D- 40% and model E – 5%. Make suitable assumption s and state them clearly. Give detailed justification for your selection. **(6)**

Q.2. a) What is aggregate planning in manufacturing planning and control? What are various aspects considered in this activity and what is importance of each aspect? **(6)**

b) What is long term and short term capacity planning? Explain factors to be considered in long term and short capacity planning **(6)**

Q.3. a) Define group technology [G T] and its need.
Explain steps to be followed for implementing [G T]. **(6)**

b) What are factors to be considered in finalizing plant layout?
Draw a plant layout for a medium scale machine shop engaged in batch production of automobile gears for spare part market. The shop contains general purpose machines like lathes, gear shaper and grinding machines in multiple numbers eg 6 lathes, 5 gear shapers , 4 cylindrical grinding machines and three drilling machines. etc. Make suitable assumption where ever required. **(6)**

Q.4. a) What is J I T [just in time] manufacturing system, its advantages and limitations? Compare JIT with conventional manufacturing system **(6)**

b) Explain in details what is Materials Requirement Planning II [M R P II] and its working. Explain how it differs from MRP. **(6)**

Q.5. a) What was the need for development of Flexible manufacturing system [FMS]? Describe working of FMS in detail with its advantages and limitations? **(6)**

b) What is production scheduling? What are the steps followed for preparing weekly schedules starting from yearly schedule for a shop manufacturing cylinder blocks for motor cycle? Make suitable assumptions if required. **(6)**

Q.6. a) What is Relation between quality and cost? What are different costs associated with

quality, enlist and explain with examples? (6)

b) What is of simulation analysis of manufacturing systems? Explain in detail with example. What is its significance? (6)

———————————————— **Paper End** ————————————————