

**MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE**  
(UGC-AUTONOMOUS)

**M.Tech I Year II Semester (R18) Regular End Semester Examinations – June 2019**

**SURFACE ENGINEERING**

(Advanced Manufacturing Systems)

**Time: 3Hrs**

**Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.

**In Q.no 1 to 5 answer either Part-A or B only**

Q.1(A) What is Tribology? Classify various parameters of the same and discuss each. 12M

**OR**

Q.1(B) Explain wear and its types with examples. What is the role of corrosion in wear? 12M

Q.2(A) Explain in detail Phosphating and Chromating with neat sketches 12M

**OR**

Q.2(B) Explain in detail various thermo-chemical processes. 12M

Q.3(A) Explain Sputtering and Plasma Nitriding processes in detail with neat sketch, while stating its limitations and how to overcome the same. 12M

**OR**

Q.3(B) Explain CVD in detail with neat sketch, while stating its limitations and how to overcome the same. 12M

Q.4(A) How do you measure the coating thickness and porosity induced in the coatings. 12M

**OR**

Q.4(B) How do you measure the wear and corrosion behavior of surface coatings? Explain any one method in detail with neat sketch. 12M

Q.5(A) What are Nano structure coatings and describe their applications. What are modified nanomaterials? 12M

**OR**

Q.5(B) How are superhard and ultrahard thin films coated on composites. Explain the process in detail using sketches where ever necessary. 12M

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Hall Ticket No:

Course Code: 18AMSP104

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**M.Tech I Year II Semester (R18) Regular End Semester Examinations – JUNE 2019**

**ADVANCED PRODUCTION AND OPERATION MANAGEMENT**

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

In Q.no 1 to 5 answer either Part A or Part B only.

- Q.1(A) Briefly describe the historical development of POM. 12M
- OR
- Q.1(B) Describe briefly about 12M  
a) Flexible manufacturing system.  
b) Automated material handling systems
- 
- Q.2(A) Explain the advantages, disadvantages and benefits of value analysis 12M
- OR
- Q.2(B) Explain line balancing. 12M
- 
- Q.3(A) Briefly explain the needs and objectives of Material requirement planning. 12M
- OR
- Q.3(B) Explain about MRP logic. 12M
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- Q.4(A) Explain symbols used in method study 12M
- OR
- Q.4(B) Write note on a) Quality assurance b) Quality Attributes c) Six Sigma and d) ISO 12M  
9000 Series Standards.
- 
- Q.5(A) Explain about Flow shop scheduling? 12M
- OR
- Q.5(B) (i) What is difference of PERT and CPM? 6M  
(ii) Explain dispatching rules in scheduling? 6M

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# MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE

(UGC-AUTONOMOUS)

M.Tech I Year II Semester (R18) Regular End Semester Examinations – JUNE 2019

## RAPID PROTOTYPING AND TOOLING

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.

In Q.no 1 to 5 answer either Part A or Part B only.

Q.1(A) What is rapid prototyping? Compare rapid prototyping with traditional prototyping. 12M

OR

Q.1(B) Discuss the evolution of rapid prototyping systems by indicating the history and their growth rate in the industrial sector. 12M

Q.2(A) (i) Explain the working principle of stereo lithography with a neat sketch. 6M  
(ii) Explain briefly about the process parameters used in fused deposition modelling. 6M

OR

Q.2(B) (i) Sketch and explain the working of fused deposition modelling process. 6M  
(ii) List the advantages and disadvantages of laminated object manufacturing. 6M

Q.3(A) Explain the principle, process parameters and process details of selective laser sintering. 12M

OR

Q.3(B) With a neat sketch explain the process of electron beam melting and also write its applications and limitations. 12M

Q.4(A) What are the types of geometric modelling techniques? Explain in detail. 12M

OR

Q.4(B) (i) Discuss on contour data processing to minimize the stair-case effect in products produced using rapid prototyping. 6M  
(ii) What is meant by part orientation? Explain. 6M

Q.5(A) (i) Discuss in detail about production tooling and bridge tooling. 12M  
(ii) Discuss with a case study how rapid prototyping is used in medical applications.

OR

Q.5(B) (i) Write the functional difference between conventional tooling and rapid prototyping tooling. 6M  
(ii) Explain with a suitable example the application of rapid prototyping in automotive industry. 6M

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**M.Tech I Year II Semester (R18) Regular End Semester Examinations – JUNE 2019**  
**FEA IN MANUFACTURING**

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.  
 In Q.no 1 to 5 answer either Part A or Part B only.

Q.1(A)

12M

Consider the bar as shown in Figure 1 is subjected to a temperature difference of 60°C. Determine the nodal displacements and stresses induced in the elements. Take the coefficient of thermal expansions as  $18.9 \times 10^{-6}/^{\circ}\text{C}$  (for E=83GPa element),  $18.9 \times 10^{-6}/^{\circ}\text{C}$  (for E=70GPa element) and  $11.7 \times 10^{-6}/^{\circ}\text{C}$  (for E=200GPa element) respectively.

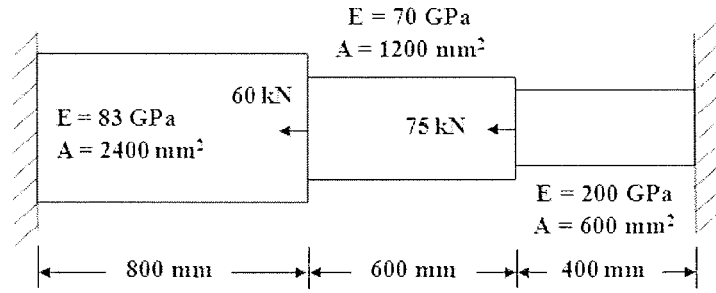


Figure 1

**OR**

Q.1(B)

For the two-bar truss shown in Figure 2, determine the displacements of node 1 and the stress in element 1-3.

12M

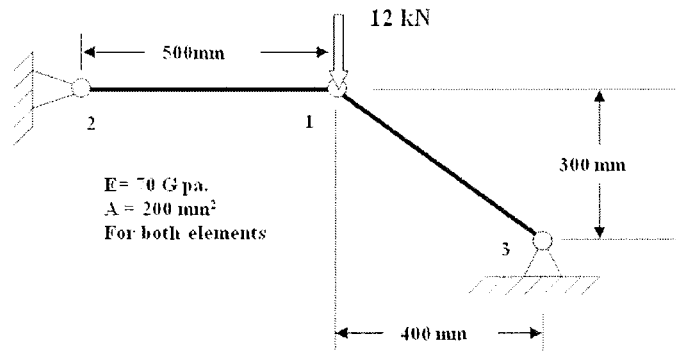


Figure 2

Q.2(A)

A beam of length 1m is simply supported at the both ends is subjected to a uniformly distributed load of 12 kN/m for the entire span. Calculate the deflection at the center of beam (Take  $E = 200 \text{ GPa}$  &  $I = 4 \times 10^6 \text{ mm}^4$ ).

12M

**OR**

Q.2(B)

For the triangular plate shown in Figure 3, determine the deflection at the point of load application and also stress induced in the plate using a one element model by considering it as plane stress problem.

12M

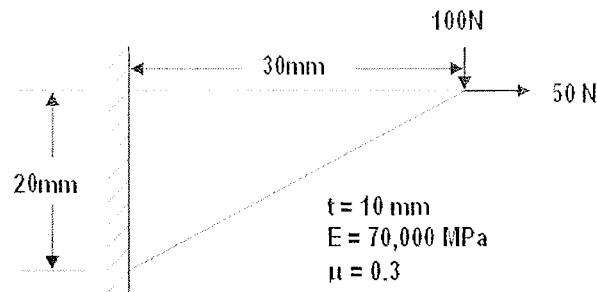


Figure 3

Q.3(A) (i) What are isoparametric elements? Determine the shape functions for a quadrilateral isoparametric element. 6M

(ii) Evaluate the following integral using one point and two-point gaussian quadrature formulae and compare the results with exact solution. 6M

$$\int_{-1}^1 (2x^3 + 5x^2 + 6) dx$$

OR

Q.3(B) i. An axi-symmetric body with a linearly distributed load on the conical surface is shown in Figure 4. Determine the equivalent point loads at node 2 (60, 40), 4 (40, 55) and 6 (20, 70). 6M

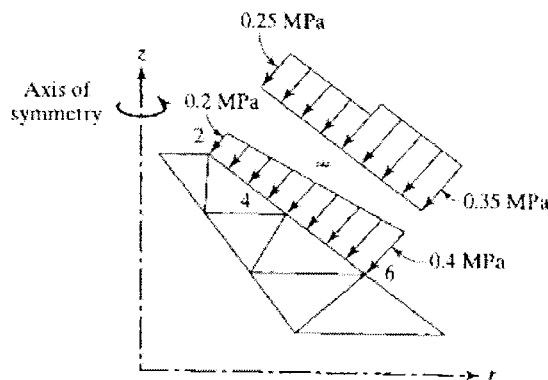


Figure 4

6M

ii. The nodal coordinates for an axi-symmetric triangular element is given as  $(r_1, z_1) = (20, 10)$ ;  $(r_2, z_2) = (40, 10)$  &  $(r_3, z_3) = (30, 50)$ . Determine the strain-displacement matrix for the above element.

Q.4(A) What do you understand by the finite element model? Give an example of modeling a component manufactured using metal forming process. 12M

OR

Q.4(B) What are the steps to be carried out for solving a structural problem with the help of a FEM software? 12M

Q.5(A) (i) Write a short note on automatic mesh generation with an illustrative example. 6M

(ii) Explain the functions served by a pre-processor in FEA. 6M

OR

Q.5(B) (i) List the desirable feature of FEA packages. 6M

(ii) What consideration are taken into account while discretizing the domain for FEA? Explain briefly. 6M

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