

Seat No.	
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B.E. (Mechanical Engineering) (Semester - VII)
Examination, November - 2017
TOTAL QUALITY MANAGEMENT (Elective - II)
Sub. Code: 67833

Day and Date : Thursday, 23 - 11 - 2017
 Time : 2.30 p.m. to 5.30 p.m.

Total Marks : 100

- Instructions :
- 1) All Questions are compulsory.
 - 2) Figures to the right indicate full marks.
 - 3) Make suitable assumptions wherever necessary and state them clearly.
 - 4) Use of statistical tables and scientific calculator is permitted.

Q1) Solve any Two.

- a) Track the journey-Inspection, Quality Control, Quality Assurance and Quality Management. [8]
- b) Enumerate customer compliant redressal mechanism being followed in an organization known to you. [8]
- c) What are the needs, wants and expectations of Internal Customers? [8]

Q2) Solve any Three.

- a) How Quality of design and quality of conformance decided? [6]
- b) How control over vendor quality is established? [6]
- c) Describe seven QC tools used in problem solving process. [6]
- d) What is Six Sigma? What are the steps involved in implementing it in an organization? [6]

Q3) Solve any Two.

- a) What do you mean by parallel, series and combined system reliability? Give suitable examples. [8]

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- b) What are the applications of reliability tests? [8]
- c) Three subsystems are reliability - wise in series and make up a system. Subsystem 1 has a reliability of 94.6%, subsystem 2 has a reliability of 99.7% and subsystem 3 has a reliability of 92.8% for a mission of 100 hours. What is the overall reliability of the system for a 100 hour Mission? [8]

Q4) Solve any Two.

- a) How TQM differs from traditional management approach? [8]
- b) What are the focus areas of Theory of Constraints? Prepare a brief write up on Feignbaum's theory of TQC. [8]
- c) Explain any one approach to TQM followed by an organization known to you. [8]

Q5) Solve any Three.

- a) Quality Policy deployment and quality function deployment lead to increase in customer satisfaction. How? [6]
- b) An organization wishes to develop quality culture. How TQM can help the organization? [6]
- c) Quality objectives should be SMART. Give a list of quality objectives set by an organization based on SMART philosophy. [6]
- d) Share details of any TQM technique implemented by an organization. Has it been successful? If yes, why? If no, why? [6]

Q6) Solve any Two:

- a) Elaborate SERVQUAL model in details. [8]
- b) What are the steps involved in implementation of ISO : 9001:2008. [8]
- c) What are the criteria used to decide winner of CII - Exim Quality Award? [8]



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**B.E. (Mechanical) (Semester - VII) (Revised) Examination,
April - 2018**

FINITE ELEMENT ANALYSIS

Sub. Code : 67503

Day and Date : Thursday, 26 - 04 - 2018

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

- Instructions :**
- 1) Draw neat labeled sketch wherever necessary.
 - 2) Assume suitable data if necessary and state it clearly.
 - 3) Figures to the right indicate full marks.

Q1) a) Write a note on past, present and future of FEA. [8]

b) If a displacement field is described by [8]

$$u = 10^{-4}(-x^2 + 2y^2 + 4xy); v = 10^{-4}(2x + 4y - y^2),$$

Determine $\epsilon_x, \epsilon_y, \gamma_{xy}$ at $x = 1; y = 0$

OR

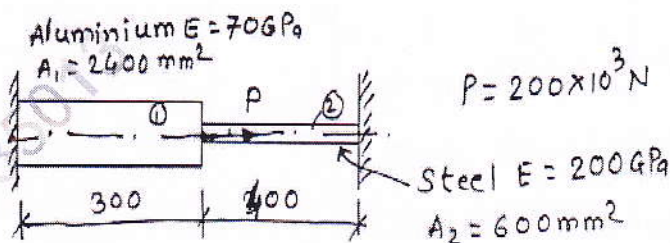
b) Explain Rayleigh Ritz method with the help of an example. [8]

Q2) a) Define shape function. Explain properties of shape function. Also draw the variation of each shape function for a one dimensional linear element. [8]

OR

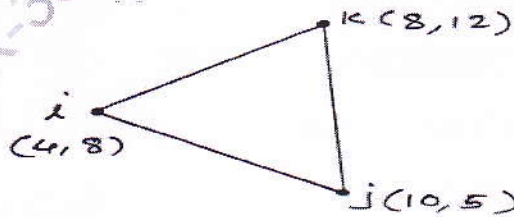
Derive the element stiffness matrix and force vector of one dimensional element using potential energy approach. [8]

b) For the bar shown below determine nodal displacements and stress in each material [8]

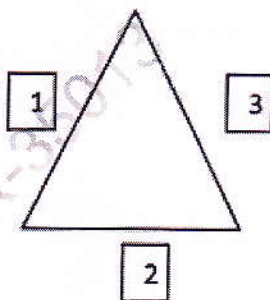


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- Q3) a) Write a short note on isoparametric element. [6]
 b) Find the shape function for the triangular element shown below and show that the sum of all shape function is one at any point within the element. [12]



- Q4) a) A long cylinder of 100 mm internal diameter and 130mm external diameter is subjected to hot fluid at 200°C from inside and ambient conditions on outside. Draw the sketch showing actual problem and also model the problem for a sample length of 10mm using axisymmetric element with proper boundary conditions. [6]
 b) The stiffness matrices and force vectors of three truss elements shown in figure is as follows:



Element No.	Nodes	
	i	j
1	1	3
2	1	2
3	3	2

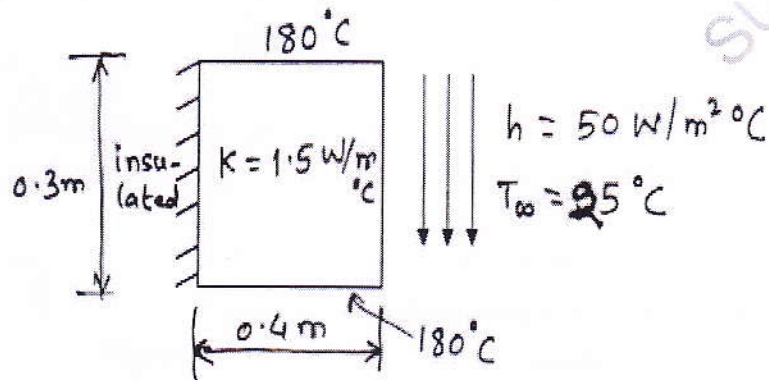
Element stiffness matrix and force vector is,

$$K_1 = \begin{vmatrix} 5 & 4 & -5 & -4 \\ 2 & 3 & -2 & -3 \\ -5 & -4 & 5 & 4 \\ -2 & -3 & 2 & 3 \end{vmatrix} \quad F_1 = \begin{vmatrix} 1 \\ -2 \\ -1 \\ 2 \end{vmatrix} \quad K_2 = \begin{vmatrix} 6 & -7 & -6 & 7 \\ -7 & 6 & 7 & -6 \\ -6 & 7 & 6 & -7 \\ 7 & -6 & -7 & 3 \end{vmatrix}$$

$$F_2 = \begin{vmatrix} 3 \\ 4 \\ -3 \\ -4 \end{vmatrix} \quad K_3 = \begin{vmatrix} 6 & 1 & -6 & -1 \\ 1 & 3 & -1 & -6 \\ -6 & -1 & 6 & 1 \\ -1 & -6 & 1 & 3 \end{vmatrix} \quad F_3 = \begin{vmatrix} 2 \\ -3 \\ -2 \\ 3 \end{vmatrix}$$

Obtain the global stiffness matrix and global force vector. [10]

- Q5) a) Derive the relation between B matrix and Jacobian. J matrix for a linear triangular element for a heat transfer problem. [6]
- b) A bar of rectangular cross-section having thermal conductivity of $1.5 \text{ W/m}^\circ\text{C}$ is subjected to boundary conditions as shown in figure. [10]



Mesh the domain with three triangular elements and obtain the conductivity matrix of each one.

- Q6) a) Write short notes on any two [10]
- Free and mapped meshing
 - Aspect ratio and distortion
 - Results validation and data interpretation
- b) Explain in detail the steps to be carried out in commercial FEA software for a simple structure made up of two truss elements. [8]

