Paper / Subject Code: 32624 / Finite Element Analysis

1T01435 - T.E.(Mechanical) Engineering)(SEM-V)(Choice Base Credit Grading System) ((R- 19) (C Scheme) / 32624 - Finite Element Analysis QP CODE: 10028904 DATE: 31/05/2023

(3 Hours) N.B.: D C

1) Question No. 1 is compulsory.

2) Attempt any three questions out of remaining five questions.

Assume suitable data if required.

Q1 Solve any 4

[Each 5 Marks]

Total Marks: 80

Explain with neat sketch the Finite Element methods.

ii) What is Boundary Condition? Explain its type in brief?

Derive the shape function for One Dimensional Linear Element in Natural Coordinates.

iv) What are the sources of Errors in FEA?

v) Explain in brief Jacobian Matrix in FEA.

vi)Write in brief about Consistent and Lumped mass matrix.

Q2 a) Solve the following differential equation using Galerkin Method.

$$\frac{d^2u}{dx^2} + 5 = 0 \; ; \quad For \; 0 < x < 1$$

Boundary Conditions are x = 0 and u = 0 and at x = 1; $\frac{du}{dx} + u = 0$

Find u (0.2) = ?

b) What is Convergence in FEA? Explain its types in brief.

[04]

c) Explain the Principle of minimum total potential with suitable example.

1041

Q3 a) Find the temperature at interfaces and heat transfer per unit area through the wall. [10]

$$T_R = 35^{\circ}C$$
,
 $h_R = 25 \text{ W/m}^{\circ}C$,
 $L_A = 50 \text{mm}$,
 $L_B = 50 \text{mm}$,
 $L_C = 50 \text{mm}$,
 $K_A = K_B = K_C = 45 \text{ W/m}^{\circ}C$

Where K- denotes thermal conductivity, h- denotes heat transfer coefficient and T-temperature. Where f is the weight of the bar. Consider one end of the bar to be fixed and other end free.

Mechanical Sample Paper 3 Semester G Scheme

DP Hallahan

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Proceedings of the 10th International Conference on Civil Engineering Guangliang Feng, 2024-07-19 This open access book is a compilation of selected papers from the 10th International Conference on Civil Engineering ICCE2023 The work focuses on novel research findings on seismic technology of civil engineering structures High tech construction materials digitalization of civil engineering urban underground space development The contents make valuable contributions to academic researchers and engineers Carbonates Linda Pastero, 2019-03-21 A multidisciplinary collection of papers dealing with many aspects of the wide world of carbonates from a geological interpretation to their environmental exploitation and biological application keeping an eye on the fundamentals of crystal growth **Tribology of Ceramics** and Composites Bikramjit Basu, Mitjan Kalin, 2011-10-07 This book helps students and practicing scientists alike understand that a comprehensive knowledge about the friction and wear properties of advanced materials is essential to further design and development of new materials With important introductory chapters on the fundamentals processing and applications of tribology the book then examines in detail the nature and properties of materials the friction and wear of structural ceramics bioceramics biocomposites and nanoceramics as well as lightweight composites and the friction and wear of ceramics in a **Energy, Waste and the Environment** R. Gieré, Peter Stille, 2004 This book provides incentives cryogenic environment for further development of sustainable fuel cycles through a novel and interdisciplinary approach to an Earth science related topic The main focus is on geochemical concepts in immobilizing isolating or neutralizing waste derived from energy production and consumption The book also addresses the issue of using some types of energy derived waste as alternative raw materials Moreover it highlights research on how certain wastes can be used for energy production an increasingly important aspect of modern integrated waste management strategies. The main objectives are to a identify the most serious environmental problems related to various types of power generation and associated waste accumulation b present strategies based on natural analogue materials for the immobilization of toxic and radioactive waste components through mineralogical barriers c discuss modern procedures for reuse of waste or certain waste components and d review the importance of geochemical modelling in describing and predicting the interaction between waste and the environment The Mechanical World ,1907 **Abstract Bulletin of the Institute of Paper Chemistry**, 1988 Applied Mechanics Reviews ,1998

Proceedings of Innovative Research and Industrial Dialogue 2016,2017-06-07 The Innovative Research and Industrial Dialogue 2016 IRID 16 organized by Advanced Manufacturing Centre AMC of the Faculty of Manufacturing Engineering of UTeM which is held in Main Campus Universiti Teknikal Malaysia Melaka on 20 December 2016 The open access e proceeding contains a compilation of 96 selected manuscripts from this Research event Chemical Engineer Richard Kidder Meade, Harry McCormack, Laurance T. Clark, Alexander G. Sclater, Lloyd Lamborn, 1913 Engineering Record, Building Record and Sanitary Engineer, 1894 High Technology: Research and Applications Anna Bogdan, Nikita

V. Martyushev, 2014-09-24 Selected peer reviewed papers from the International Conference for Young Scientists High Technology Research and Applications 2014 HTRA 2014 March 26 28 2014 Tomsk Russia **Manual Training Magazine** Charles Alpheus Bennett, William Thomas Bawden, 1928 Energy Research Abstracts, 1984 Industrial Arts Magazine Scientific and Technical Aerospace Reports ,1995-05 Frontiers in Silk Science and ,1928 **Paper** ,1999 **Technology** Nicola Maria Pugno, Antonella Motta, David Kaplan, 2021-07-27 THERMEC 2021 Mihail Ionescu, Christof Sommitsch, Cecilia Poletti, Ernst Kozeschnik, Tara Chandra, 2021-01-05 International Conference on Processing Manufacturing of Advanced Materials Processing Fabrication Properties Applications Selected peer reviewed papers from the International Conference on Processing Manufacturing of Advanced Materials Processing Fabrication Properties Applications THERMEC 2021 May 10 14 2021 Vienna Austria Journal of Education ,1881 The Engineer ,1903

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