AR16

CODE: 16MTE1011

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, June-2019
FUELS, COMBUSTION AND ENVIRONMENT
(Thermal Engineering)

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Explain briefly the process of coal liquefaction.	6
	(b)	Explain proximate and ultimate analysis of coal	6
2.	(a)	Explain different physical properties of coal	6
	(b)	Explain carburisation	6
3.	(a)	What are the assumptions for Fuel Combustion Stoichiometric calculations?	8
	(b)	Calculate the amount of theoretical oxygen required for complete combustion of 20kg of the following coal composition: C=74%; H=12%; S=5%; ash=3.5%; O=4% and remaining moisture.	4
4.	(a)	Explain different combustion processes.	8
	(b)	Derive the Arrhenius equation using fundamentals of combustion kinetics	4
5.		Explain stationary flame and laminar flame structures with possible sketches	12
6.	(a)	Explain adiabatic flame temperature briefly	8
	(b)	Differentiate between Higher calorific value and lower calorific value	4
7.		Discuss briefly about liquid droplet combustion	12
8.		Discuss briefly of various methods of emission control.	12

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CODE: 16MPE1009   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

SWITCHED MODE POWER CONVERTERS
(PED)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	With neat circuit diagram and waveform explain the operation of Forward converter.	6M
	(b)	Mention the classification of SMPS converters.	6M
2.	(a)	Describe the operation of Push-Pull converter with circuit diagram. Also derive the expression of output voltage and inductor current.	7M
	(b)	A Push-Pull converter has the following parameters: V_S = 30 V, N_P/N_S = 2, D = 0.3, L_x = 0.5 mH, R = 6 Ω, C = 50 µF, f = 10 kHz. Determine V_O, the maximum and minimum value of inductor current and the output ripple voltage.	5M
3.	(a)	Explain the operation Full-bridge converter with circuit diagram under various switching modes.	6M
	(b)	Discuss the operation of Half-bridge isolated dc-dc converter with necessary diagrams.	6M
4.	(a)	Explain boost converter with necessary circuit and waveforms. Also drive steady state output voltage and inductor current from dynamic model.	6M
	(b)	With small-signal model explain operation of buck converter using waveforms.	6M
5.	(a)	Discuss function of PI and PID controller in a system.	6M
	(b)	With an example explain how phase and gain margin can identify for stable system.	6M
6.	(a)	Discuss the operation of series full-bridge bidirectional resonant converter with circuits and waveforms.	7M
	(b)	Brief the concept of basic resonant converter.	5M
7.	(a)	Classify resonant converter circuits.	6M
	(b)	Explain the concept of ZVS by M-type resonant converter with waveforms.	6M
8.	(a)	With necessary circuit and waveform explain working principle ZCS L-type resonant converter.	6M
	(b)	Brief about switching configuration for ZCS and ZVS resonant converter.	6M

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CODE: 16MCS1010   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, June-2019

DATA MINING AND KNOWLEDGE DISCOVERY
Computer Science & Engineering

Time: 3 Hours   Max Marks:60

Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Define data pre-processing. Explain about Binarization.	(6M)
	(b)	What are OLAP operations in the multidimensional data model? Explain	(6M)
2.	(a)	What are summery statistics? Explain.	(6M)
	(b)	Give examples of Proximity measures.	(6M)
3.	(a)	Write the general approach to solve a Classification problem	(4M)
	(b)	Explain about the methods for evaluating the performance of a classifier.	(8M)
4.	(a)	Explain about the nearest neighbour classifiers .	(4M)
	(b)	Define Bayesian Belief Networks and explain about Model representation and model building.	(8M)
5.	(a)	Explain frequent Item set generation in the Apriori algorithm.	(8M)
	(b)	Describe the importance of support counting in frequent item set generation.	(4M)
6.	(a)	Distinguish between the methods in handling Categorical and continuous Attributes.	(8M)
	(b)	Write the examples of sub graphs.	(4M)
7.	(a)	What are the different types of clusters? Explain.	(6M)
	(b)	Describe the strengths and weaknesses of K-means algorithm.	(6M)
8.	(a)	Define agglomerative hierarchical clustering algorithm also enumerate its strengths and weaknesses.	(6M)
	(b)	Analyze various specific techniques involved in agglomerative hierarchical clustering algorithm.	(6M)

CODE: 16MSE1011   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular & Supplementary Examinations, June-2019
## Finite Element Method in Structural Engineering
(STRUCTURAL ENGINEERING)

**Time: 3 Hours**   **Max Marks:60**
Answer any FIVE questions
All questions carry EQUAL marks

1.	(a)	Derive the Shape functions in general form for typical 2-noded element.	4 M
	(b)	Write the energy principle and potential energy with the spring example.	8 M
2.		What is the importance of natural coordinate system in the formulation of the finite element equations? Obtain the interpolation functions for a two noded axial element.	12 M
3.	(a)	Write the difference between plane stress and strain with examples.	6 M
	(b)	Derive the constitutive relation for the plane stress condition.	6 M
4.		Write complete general forms (stiffness matrix using direct stiffness matrix approach) for the following and explain them in detailed.	12 M
		(a) Axial bar element.	
		(b) Beam Element neglecting axial deformation	
		(c) Plane Truss Element	
5.	(a)	Write about constant strain triangular element (CST).	2 M
	(b)	Write the expressions for shape functions in a CST (constant strain triangular) element.	10M

6. Determine the displacements and stresses in the axially loaded tension member shown in Figure. When pull Load on member is 1 kg. and $E=2 \times 10^6$ kg/cm^2

A = 1 cm²
A = 2 cm²
3
2
2
1
1 − 1 kg
10 cm
10 cm
E = 2 x 10⁶ kg/cm

Axially Loaded Tension Member
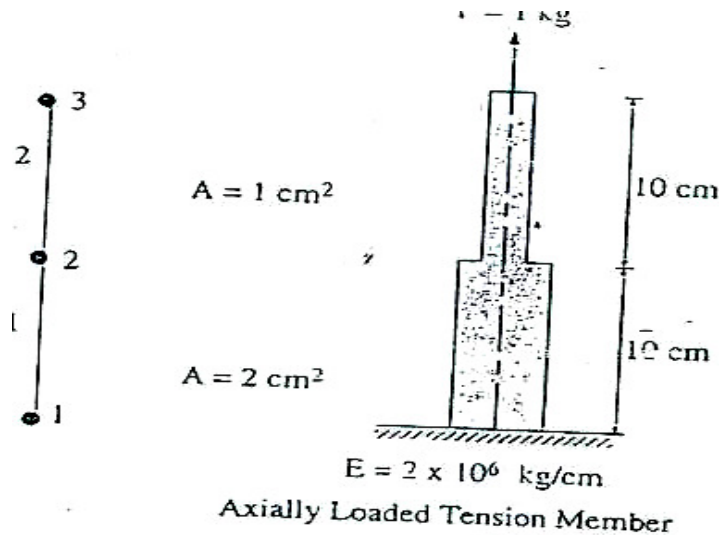
7. Find joint displacements and axial forces in a plane truss shown in the following figure. Area of cross section of all members is 10^{-3} m^2, $E = 210$ GPa.

3m
4m
3
30°
20kN
2
4
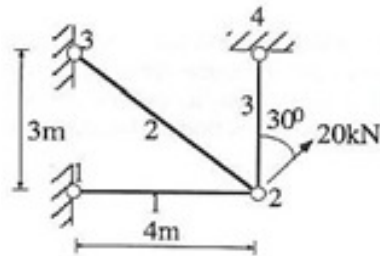
8. A two-span beam is subjected to a moment as shown in the following figure.
Find resulting displacements. Assume E= 206.842 GPa, $I = 8.3246 \times 10^{-5}$ m^4, L = 4.572 m, M = 113 kN-m.

M
EI
EI
L
L

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CODE: 16MVL1009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Supplementary Examinations, June-2019
MIXED SIGNAL IC DESIGN
(VLSI System Design)

Time: 3 Hours   Max Marks: 60

Answer any FIVE questions
All questions carry EQUAL marks

1. (a) Explain the basic building blocks of a switched capacitor circuit. 8M
   (b) Differentiate Continuous time implementation and Switched capacitor implementation. 4M

2. (a) Explain the concept of switch sharing in the design of a switched capacitor circuit with neat sketch. 4M
   (b) Design and analyse a high Q Bi-quad filter. 8M

3. (a) Explain the operation of basic charge pump PLL. 6M
   (b) Explain how PFD is used in a Phase Locked Loop 6M

4. (a) Discuss about Delay Locked Loops. 6M
   (b) Explain the concept of skew reduction in phase locked loops. 6M

5. (a) Discuss on the DC specifications of data converters. 6M
   (b) Explain briefly about nyquist rate D/A converters. 6M

6. (a) Explain briefly about interpolating flash converters. 6M
   (b) Explain the operation of a two-step capacitive MDAC A/D converter with neat sketches. 6M

7. (a) Explain the concept of nonlinear effects in second order delta sigma modulators 6M
   (b) Explain the concept of higher order single quantizer modulator in detail. 6M

8. (a) Draw the block diagram of delta sigma D/A converter and explain each block. 4M
   (b) Draw the architecture of an interpolating filter and explain its role in a delta sigma D/A converter. 8M