AR13 **Set-01**

Code: 13MTE1011

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2016
FUELS, COMBUSTION AND ENVIRONMENT
(Thermal Engineering)

Time: 3Hours **Max. Marks: 60**

Answer any FIVE Questions
ALL questions carry equal marks

1. (a) What is the elemental composition (or chemical composition) of a typical Indian coal? What are the dis-advantages of Indian coal? Explain. (4+3 M)
   (b) Alcohols and Biogas will be alternatives for conventional fuels. Comment. (5M)
   .
2. (a) What do you understand about combustion stoichiometry? Explain. (5M)
   (b) A coal with a dry, ash-free composition of 88% carbon, 9% hydrogen, 2% sulfur, and 1% oxygen is burned with 24% excess air. The coal fired ash and moisture contents are 6% and 4% respectively. What is the flue gas composition? (7M)

3. (a) What are pure-hydrocarbons? Explain the oxidation behavior of pure hydro-carbon components. (2+4M)
   (b) Explain the following: (i) Uni-molecularity, (ii) Bi-molecularity, and (iii) Tri-molecularity. (2+2+2M)

4. (a) Derive the expression for 'adiabatic flame temperature'. (5M)
   (b) What is 'higher heating value' of a fuel? How do you estimate the 'higher heating value' of a liquid fuel? Explain with a simple diagram. (1+3+3M)

5. (a) What are the phases of liquid-fuel burning? Explain briefly. (5M)
   (b) With a neat sketch, describe the process of flat-grate type firing system used for solid fuel combustion. (3+4M)

6. (a) What are the effects of automotive air-pollution on human health? Explain briefly. (5M)
   (b) What are the techniques do you suggest to reduce the NOx emissions from IC Engines? Explain briefly. (7M)

7. (a) What is enthalpy of formation? (4M)
   (b) What is 'blast furnace gas'? What is the chemical composition 'blast furnace gas'? And what are the uses? (2+4+2M)

8. (a) With a neat diagram, describe the combustion process in pulverized-coal fired furnace. What are the advantages? Explain. (3+3+2M)
   (b) What do you understand about 'European standard emission norms' of automotive vehicles? Describe briefly. (4M)

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AR13 **Set-01**

13MPE1009

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2016

SWITCHED MODE POWER CONVERTERS
(PEED)

Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry EQUAL marks

1. a. What are single step isolated converters? Explain their principle of operation.
   b. Explain the topology of push pull converters.

2. a. Compare various topologies of switching converter.
   b. Explain the working of a full wave zero current switch topology with the help of circuit and waveforms.

3. a. Explain the working of forward converter.
   b. classify various SMPS

4. a. Explain the working of half bridge isolated buck convertor.
   b. Write short notes on isolation transformer and discuss briefly various types of isolated bridges.

5. a. Discuss the frequency domain analysis of linear time invariant systems.
   b. Explain the criterion for the selection of controller parameters.

6. a. Formulate the dynamic equations of buck converter.
   b. What is meant by average circuit model? Obtain the average model of a boost converter.

7. a. Classify the resonant converter circuits.
   b. Explain the operation of series resonant circuits.

8. a. Explain the principle of zero voltage switching.
   b. Explain the working M-type buck converter.

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AR13 **Set-02**

Code No: 13MVL1009

ADITYA INSTITUE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular / Supplementary Examinations, August-2016

DSP PROCESSORS AND ARCHITECTURES
(Common to Digital Electronics and Communication Systems, VLSI System Design)

Time: 3 hours **Max. Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. a) Discuss about linear time invariant system with examples (6M)
   b) Compute the DFT of a sequence $(-1)^n$ for N=4 . (6M)

2. a) Describe the following Number formats with examples for signal and coefficients in DSP system
   i)Fixed point Format ii)Floating Point format (6M)
   b) Derive Signal to Noise ratio of A/D system in DSP Implementation. (6M)

3 a) Discuss about DSP Computational building blocks (6M)

b) Discuss about Bus architecture and memory of a DSP processor. (6M)

4) a) Write in detail about Hardware looping? (6M)
   b) Discuss about pipeline and its performance. (6M)

5. a) Compare the Architectural features of TMS320C25 and ADSP2100. (6M)
   b) Describe on chip peripherals of TMS 320C54 xx processor with a neat block diagram. (6M)

6 a) Explain about the Q-notation in DSP algorithms. (6M)
   b) Discuss about PID controller. (6M)

7 a) Explain about an DIT-FFT algorithm to compute DFT (6M)
   b) Discuss Computation of signal spectrum. (6M)

8. Write short notes on the following.
   a) CODEC-DSP (6M)
   b) Direct memory access (6M)

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AR13 Set-01

Code No : 13MCS1007

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech II Semester Regular Supplementary Examinations, August-2016
DATA WAREHOUSING AND DATA MINING
(Computer Science and Engineering)

Time : 3 hours **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1) a)What is OLAP? Explain its operations. [6M]
   b) Explain the three-tier data warehousing architecture. [6M]

2) a) Why Data mining is important? Explain the architecture of a typical data mining system.
   b) Explain about data transformation. [8M+4M]

3) a) Explain data discretization techniques. [6M]
   b) Write brief notes on various data mining Functionalities. [6M]

4) a) What are Association Rules? Explain various Kinds of Association Rules for Mining. [8M]
   b) What are support and Confidence? Explain with an example. [4M]

5) a) Explain Apriori Algorithm for finding frequent item sets using candidate generation. [8M]
   b)What is Meant by data classification Explain its process with an example. [4M]

6) a) Explain Bayes Theorem. Write short notes on Navie Bayesian classification. [8M]
   b) Explain Rule Based classification using IF-THEN Rules for classification. [4M]

7) a) Explain Rule Induction Using a Sequential Covering Algorithm . [6M]
   b) Write short notes on outliers. Explain Density Based local outlier detection. [6M]

8) a) Discuss various categories of Major Clustering Methods. [6M]
   b) What is cluster Analysis? What are Requirements of clustering in Data mining? [6M]

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AR13

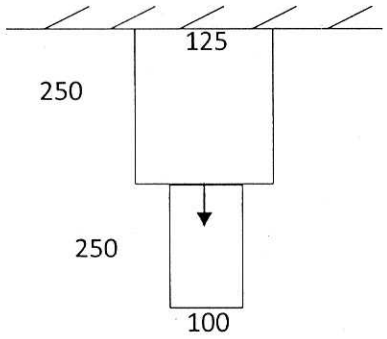
Code No: 13MSE1011 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
I M.Tech. II Semester Regular Examinations, August-2016
FINITE ELEMENT METHOD
(STRUCTURAL ENGINEERING)

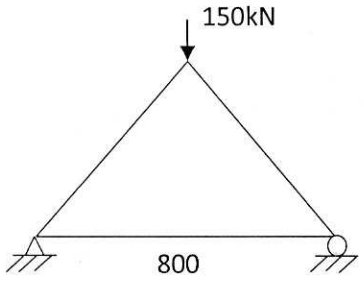
Time: 3 Hours **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

1. Derive the strain displacement relations in case of three dimensional analysis?
2. Solve the uniform bar subjected to a linearly varying load by weak form of weighted residual technique, for which the governing differential Equation is given by $AE(d^2u/dx^2)+ax=0$ and take $u(x)=a_1x+a_2x^2$?
3. Explain various typical elements used for analysing various types of structures and also draw neat sketches of them?
4. Thin plate of uniform thickness 20mm is shown below. In addition to self weight the plate is subjected to a point load of 400N as shown. E = 2x105 N/mm2, unit weight = 0.8x10-4N/mm3. Analyze the plate using line elements and find the stresses in each element?



5. Determine the nodal displacements and stress in each bar for the truss shown below assuming the area of cross section of each bar is $1000mm^2$ and height of the triangle is 400mm?



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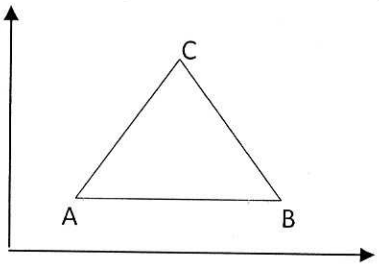
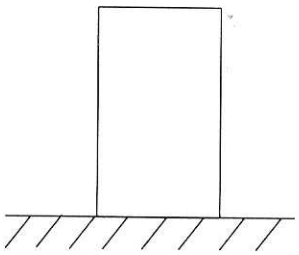
6. Calculate stiffness matrix for the triangular steel plate of 10mm thick shown below considering it as plane stress condition. Where A is (100, 100); B is (400,100); C is (200, 400)?



7. Determine the strain-displacement matrix for a dam problem having base 200mm and height 1000mm shown below considering it as plane stain condition?



8. Consider a four bar truss as shown in figure below that E = 200 GPA and A = 500 mm^2 for all the elements. Determine
   a) Nodal Displacements
   b) Support reaction
   c) Element stresses