CODE: 13CE2008

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular /Supplementary Examinations, April-2017

STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 X 10 = 10 M]**

1. a) Point of contra flexure.
   b) Macaulay's Method
   c) Influence line
   d) Write deflection equation if udl load is acting on simply supported beam
   e) In what why statically indeterminate beam is different from statically determinate beam.
   f) Theorem of three moments
   g) Fixed beam
   h) What is the perfect and Imperfect frame
   i) Method of sections
   j) Three hinged arches subjected to effect of temperature

PART-B

Answer one question from each unit **[5 X 12 = 60M]**

UNIT-I

2. Find the forces in the members of the truss as shown in Fig. 1. The cross-sectional area and young's modulus of all the members are the same.

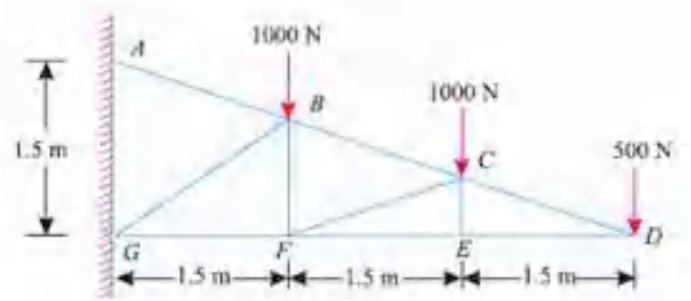

Fig. 1

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(OR)

3. Find the forces in the members of the truss as shown in Fig. 2. The cross-sectional area ($1800X10^{-06}$ m^2) and young's modulus (200 GPa) of all the members are the same.

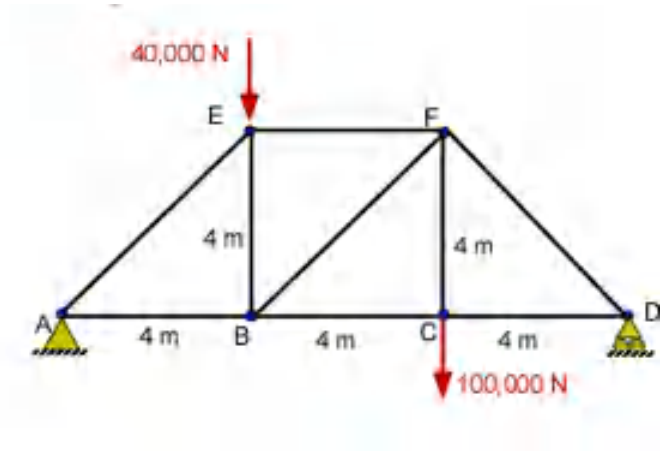

Fig. 2

UNIT-II

4. A three hinged parabolic arch of span 25.0m and rise 5.0m carries uniformly distributed load of 50 kN/horizontal meter run over the right half of the span. Calculate the supportreactions and also find bending moment, radial shear and normal thrust at a section 10m from the right support.

(OR)

5. Discuss in detail about Elastic theory of arches for three hinged circular arch and also derive Eddy's theorem and mention its importance.

UNIT-III

6. a) A cantilever beam of length 9m is carrying a point load of 90 kN at a distance of 5m from the fixed end. The cantilever is propped rigidly at free end. Determine the reaction at the rigid propped draw SF and BM diagrams.

   b) Discuss in detail about determination of deflections for Fixed beam with Uniformly distributed load using differential equation and Moment area method

(OR)

7. a) A fixed beam of length 7 m carries a concentrated load of 30 kN at a distance of 3 metres from left hand end. Determine (i) support moments)ii) position of the points of contraflexure from left hand end (iii) deflection under the load. (EI = 16000 kNm^2).

   b) A horizontal cantilever ABC, 4 m long is built in at A, and simply supported at B, 3 m from A by rigid prop so that AB is horizontal. If AB and BC carry uniformly distributed load of 20 kN/m and 30 kN/m respectively, find the load taken by the prop.

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UNIT-IV

8. a) Derive an expression for three moments of a continuous beam with middle support sink by an amount of δ_1 with respect to left end support and δ_2 with respect to right end support.

   b) Evaluate the support moments and reactions at supports for the following beam below (Fig.3).

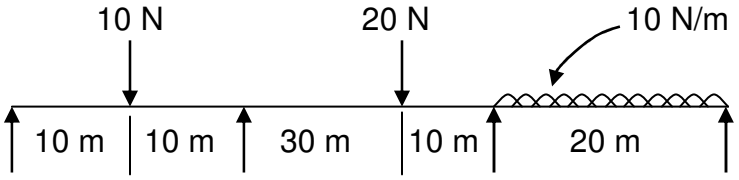

Fig. 3

(OR)

9. A continuous beam ABC consists of two spans AB of length 4m, and BC of length 3m.The span AB carries a point load of 100 KN at its middle points. The span BC carries a point load of 120 KN at 1m from C. The end A is fixed and the end C is simply supported Find :
   i) The moments at the supports
   ii) The reactions at the supports and
   iii) Draw the B.M diagram
   Use Clapeyron's theorem of three moments

UNIT-V

10. A system of wheel loads crosses a girder of 21.60m span, which is simply supported at its ends. The loads and their distances are as follows.
    Wheel load (kN) : 100 200 200 150
    Distance between centre (metres) : 1.80 2.70 2.40 2.10
    Determine:
    (i) The maximum B.M at quarter span
    (ii) The maximum B.M in the girder.

(OR)

11. Write in detail about maximum S.F. and B.M. at a given section and absolute maximum S.F. and B.M. due to single concentrated load for any overhang beam.

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AR13 SET-1

Code: 13EE2012

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular /Supplementary Examinations, April-2017

POWER SYSTEMS-I

(Electrical and Electronics Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 X 10 = 10 M]**

1. (a) What are the advantages of thermal power stations
   (b) State the factors to be considered for selection of site in hydro electric power stations
   (c) State the nuclear materials used in nuclear power plants
   (d) State the applications of gas turbine plant
   (e) State the different cases of DC distributors
   (f) Classify the substations
   (g) State the factors affecting the cost of power generation
   (h) Define tariff
   (i) List electrical characteristics of cables
   (j) What are the advantages of gas insulated substations

PART-B

Answer one question from each unit **[5 X 12=60M]**

UNIT – I

2. Explain the working of steam power station by describing the main components

(OR)

3. How the hydro electric power plants are classified and discus briefly

UNIT-II

4. Explain the working of solar power station by describing the main components

(OR)

5. Describe Pressurized Water Reactor (PWR) used in nuclear power plants

UNIT-III

6. An electric train taking a constant of 600 Amps moves on a section of line between two sub stations 8km apart and maintained at 575 and 590 volts respectively. The track resistance is 0.04 ohms per km both go and return. Find the point of minimum potential along the track and currents supplied by two substations at that instant

Code: 13EE2012

(OR)

7. Explain 33/11kV substation with line diagram

UNIT-IV

8. A generating station supplied the following loads: 159MW, 120MW, 85MW, 60MW and 5MW. The station has a maximum demand of 220MW. The annual load factor of the station is 48%. Calculate i) The number units supplied annually ii) The diversity factor and iii) The demand factor

(OR)

9. Describe various types of tariffs

UNIT-V

10. Define grading of cables with neat sketches. Explain in detail capacitance grading and inter sheath grading

(OR)

11. a) State the disadvantages of gas insulated sub stations [4M]
    b) Explain gas insulated substations with single line diagram [8M]

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AR13

CODE: 13ME2011 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech II Semester Regular / Supplementary Examinations, April-2017

THERMAL ENGINEERING-1
(Mechanical Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 × 10=10 M]**

1. a) Write the formula for air standard efficiency of Carnot cycle?
   b) Draw the p-v and T-s of ideal diesel cycle and state various processes.
   c) What are the stages of combustion in SI engine?
   d) What is pre-ignition?
   e) What is Cetane number?
   f) What is delay period in IC engines?
   g) Define Indicated mean effective pressure?
   h) List various efficiencies associated with engines?
   i) What do you mean by chocking?
   j) Define Isentropic efficiency of a axial flow compressor?

PART-B

Answer one question from each unit **[5 × 12=60 M]**

UNIT-1

2. a) List the main differences between actual cycles and air standard cycles. **[6 M]**
   b) Define volumetric efficiency and discuss the effect of various factors affecting the volumetric efficiency. **[6 M]**

(OR)

3. a) Draw the schematic diagram of the fuel feed pump and explain its working principle. **[6 M]**
   b) What are the requirements of an ignition system? **[6 M]**

UNIT-II

4. a) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation. **[6 M]**
   b) Discuss about the basic requirements of SI engine combustion chamber? **[6 M]**

(OR)

5. a) What is meant by abnormal combustion? Explain the phenomenon of knock in SI engines? **[6 M]**
   b) What are the desirable qualities of SI engine fuels to inhibit detonation? **[6 M]**

UNIT-III

6. a) Briefly explain the process of combustion in CI engine and explain various stages. **[6 M]**
   b) What is delay period and what are the factors that affect the delay period. **[6 M]**

(OR)

7. a) Classify and explain briefly about CI engine combustion chambers. List advantages and draw backs of direct injection chambers. **[6 M]**
   b) Explain diesel knock and how it is differ to petrol engine. **[6 M]**

UNIT-IV

8. A four stroke, four cylinder gasoline engine has a bore of 60 mm and a stroke of 100 mm. On test it develops a torque of 66.5 Nm when running at 3000 rpm. If the clearance volume in each cylinder is 60 cc the relative efficiency with respect to break thermal efficiency is 0.5 and the calorific value of fuel is 42 MJ/kg, determine the fuel consumption in kg/h and the break mean effective pressure. **[12M]**

(OR)

9. During the trail of a single cylinder four stroke oil engine the following results were obtained cylinder diameter 20 cm, stroke 40 cm, mean effective pressure 6 bar, torque 400 Nm, speed 250 rpm, oil consumption 4 kg/h, calorific value of fuel 43 MJ/kg, cooling water flow rate 4.5 kg/min, air used per kg of fuel 30 kg, temperature of exhaust gases 450 ^{o}C, room temperature 20 ^{o}C, mean specific heat of exhaust gases is 1 kJ/kg K and specific heat of water 4.18 kJ/kg K. Find the indicated power, break power and draw up a heat balance sheet for the test in kJ/h. **[12 M]**

UNIT-V

10. a) What is clearance in reciprocating compressor and explain the effect of clearance volume on compressor work **[6 M]**
    b) What is a positive displacement compressor explain working principle of vane type blower with a neat sketch? **[6 M]**

(OR)

11. a) Explain with a simple sketch construction and working of an axial flow compressor. **[6 M]**
    b) What is a centrifugal compressor? How does it differ from an axial flow compressor? **[6 M]**

AR13 SET-2

Code: 13EE2013

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Regular /Supplementary Examinations, April-2017

LINEAR CONTROL SYSTEMS

(Electronics and Communication Engineering)

Time: 3 Hours **Max Marks: 70**

PART-A

Answer all questions **[1 X 10 = 10 M]**

1. a) Define sensitivity of the systems.
   b) Write any two rules for block diagram reduction.
   c) Write the standard form of transfer function for first order system .
   d) What are the applications of servomotors
   e) Define peak time.
   f) Draw the approximate polar plot for the function $G(s)H(s) = \frac{1}{s^3 + Ts)}$.
   g) What are the effects of PID Controller?
   h) What is the need of lead compensation in Control Systems?
   i) What is gain margin and phase cross-over frequency?
   j) Define Nyquist stability criteria?

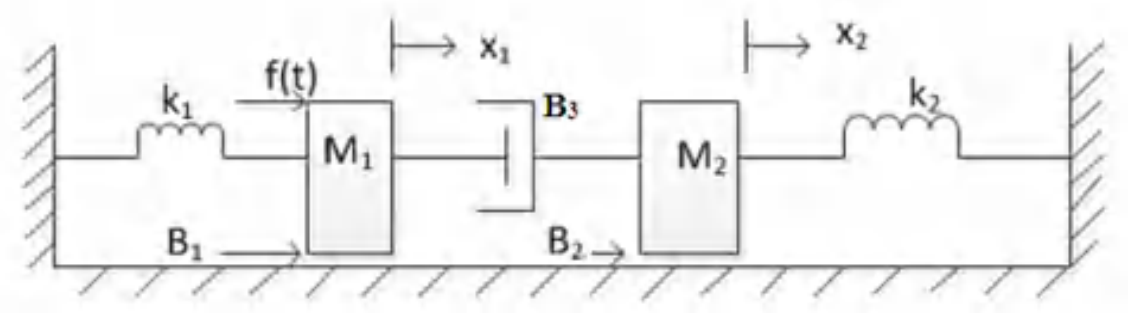
PART-B

Answer one question from each unit **[5 X12=60M]**

UNIT-I

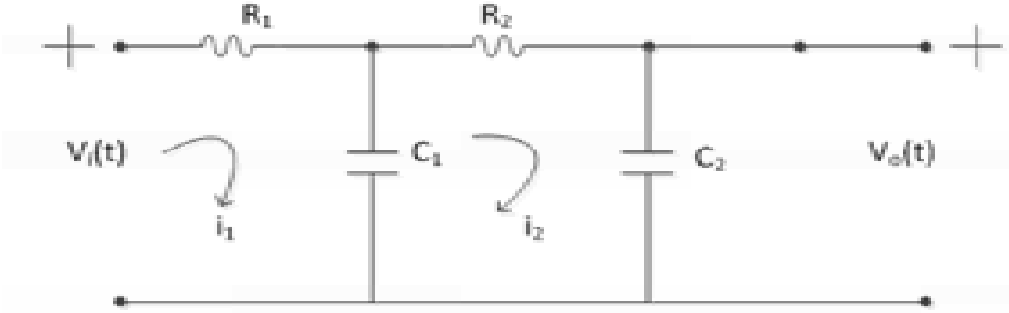
2.a) Explain the effect of feedback on parameter variation. [4M]

b) For the mechanical system below,find the transfer function $x_1(s) / F(s)$. [8M]



(OR)

3. (a) Derive the transfer function of AC servomotor. [6M]
   (b) For the electrical circuit given below, Find $V_0(s) / V_i(s)$. [6M]



Code: 13EE2013

UNIT-II

4. a) Evaluate the static error constants for a unity feedback system having a forward path transfer function $G(S) = \frac{50}{S(S+10)}$. Estimate the steady state errors of the system for the input r(t) given by r(t)= $1+2t+t^2$. [12M]

(OR)

5. Derive the transfer function and develop the block diagram of armature controlled DC servo motor**.** [12M]

UNIT-III

6. The open loop transfer function of a unity feedback system is given by

$G(S) = \frac{K}{(S+2)(S+4)(S^2+6S+25)}$. By applying the Routh criterion, discuss the stability of the closed loop system as a function of 'K'. Determine the value of 'K' which will cause sustained oscillations in the closed loop system. What are the corresponding oscillation frequencies? [12M]

(OR)

7. Construct the root locus for the function , $G(S)H(S) = \frac{K(S+2)}{(S+1)^2}$. And discuss about the stability of the system. [12M]

UNIT-IV

8. a) For the system with $G(S)H(S) = \frac{400}{S(S+2)(S+10)}$. Draw the polar plot. [8M]
   b) Explain how phase margin and gain margin are obtained from polar plot. [4M]

(OR)

9. Sketch the bode plot for the following transfer function and determine the phase margin and gain margin of the system $G(S) = \frac{10}{S(1+0.5S)(1+0.1S)}$. [12M]

UNIT-V

10. a) Draw the circuit diagram of a Lag compensator and obtain its transfer function, mention the advantages and drawbacks of Lag compensator. [8M]
    b) Derive the derivation for State Transition Matrix . [4M]

(OR)

11. a) Given the system $\dot{x} = \begin{bmatrix} 0 & 0 & -20 \\ 1 & 0 & -24 \\ 0 & 1 & -9 \end{bmatrix} x + \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix} u$, $y = [0 \quad 0 \quad 1]x$ find out its characteristic equation. [6M]
    b) Given $A = \begin{bmatrix} 0 & -2 \\ 1 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$, $C = [0 \quad 1]$ Find whether it is state Controllable (or) Observable [6M]

AR13

CODE: 13CS2009 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular /Supplementary Examinations, April-2017

FORMAL LANGUAGES AND AUTOMATA THEORY

(Common to CSE & IT)

Time: 3 Hours **Max Marks: 70**

PART-A

ANSWER ALL QUESTIONS **[1 x 10 = 10 M]**

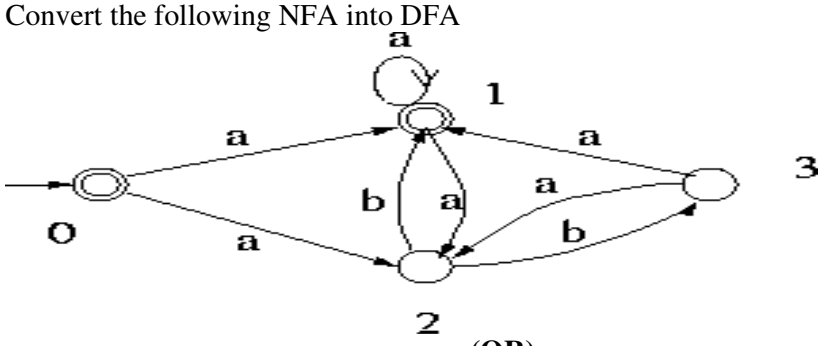
1. a) Differentiate DFA and NFA.
   b) Define Mealy machine.
   c) Is (L*)* = L*?
   d) What is the principle used in pumping lemma for regular sets.
   e) Give CFG for the language having set of balanced parenthesis strings.
   f) List the properties of a derivation tree.
   g) Define ID of a PDA.
   h) Differentiate final state and empty stack acceptance of a PDA.
   i) What is Church's hypothesis?
   j) Define PCP.

PART-B

Answer one question from each unit **[5x12=60M]**

UNIT-I

2. a) State and prove equivalence of NFA and DFA. **6 M**
   b) Convert the following NFA into DFA **6 M**



(OR)

3. a) Construct DFA for the language which does not have a substring '010'. **6 M**
   b) Design a Moore machine to determine residue mod 3 for each ternary string treated as integer. **6 M**

UNIT-II

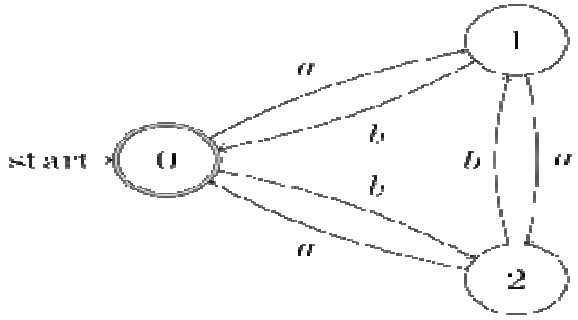
4. a) Show that L = $\{0^i 1^j / \gcd(i, j) = 1\}$ is not regular. **6 M**
   b) Construct finite automata for the regular expression (0+1)*011 **6 M**

(OR)

AR13

CODE: 13CS2009 SET-1

5. a) State the closure properties of regular sets . **6 M**
   b) Construct regular expression for the given finite automata **6 M**



UNIT-III

6. a) Give CFG for the Language L={$a^i b^j c^k$ /i=j+k} **6 M**
   b) Given a Grammar G=({E},{+,*,id},P,E) where P=E->E+E/E*E/id. **6 M**
   Give all possible LMD's, RMD's and also parse tree for the string id+id*id+id.

(OR)

7. a) Define a useless symbol. Give the algorithm for removing useless symbols of a given grammar. **6 M**
   b) Define CNF grammar and convert the following CFG into its equivalent CNF **6 M**
   S->ABC A->BC/a B->bAC/ε C->cAB/ ε

UNIT-IV

8. a) Define PDA. Design a PDA for the language L={ww^r/w{a,b}*} **6 M**
   b) Design a PDA for the grammar having productions **6 M**
   S->0A, A->0ABC/1B/0, B->1, C->2

(OR)

9. a) Convert the PDA P={{p,q}, {0,1}, {X,Z}, q, Z, { }, δ} into a CFG where δ is given as 1) δ(q,1,Z)={(q,XZ)}, 2) δ(q,1,X)={(q,XX)}, 3) δ(q,0,X)={(q,X)} 4) δ(p,0,Z)={(q,Z)}, 5) δ(q, ε,X)={(q, ε)}, 6) δ(p,1,X)={(p, ε)} **6 M**
   b) Construct PDA for the language L={$a^n b^m c^n$/n>=1,m>=1} **6 M**

UNIT-V

10. a) Design Turing Machine for L={$a^n b^n c^n$/n>=1}. **6 M**
    b) Discuss in detail the techniques of TM Construction. **6 M**

(OR)

11. a) What is UTM? Explain in detail. **6 M**
    b) Write short note on NP complete and NP hard problems. **6 M**

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