AR13

CODE: 13CE2008 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular / Supplementary Examinations, May-2016

STRUCTURAL ANALYSIS-I

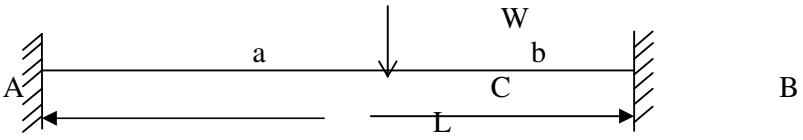
(CIVIL ENGINEERING)

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

PART-A

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

1. a) What are different types of frames?
   b) What are the different methods used to analyze trusses?
   c) Define Eddy's Theorem?
   d) Write short notes on elastic theory of arches?
   e) What is the degree of indeterminacy of a propped cantilever?
   f) For a fixed beam shown in fig , show the pattern of B.M diagram.



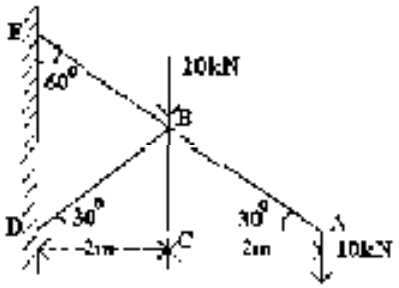
   g) What are the merits of the theorem of three moments?
   h) Define the point of contra flexure?
   i) Draw I.L.D for a simply supported beam for finding the reactions at the supports.
   j) How many reactions have the fixed beam?

PART-B

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

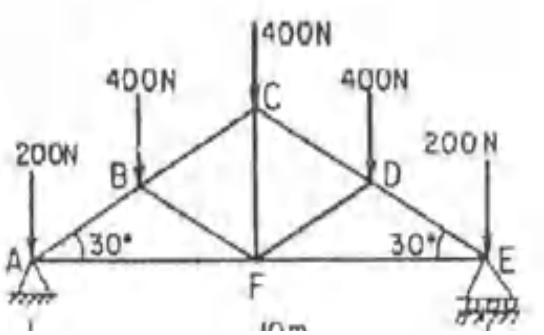
UNIT-I

2. Using the method of sections find the forces in all the members of the cantilever truss loaded as shown in figure 12M



(OR)

3. Determine the forces in the various members of the truss by method of joints shown in **Figure** 12M



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UNIT-II

4. A three-hinged parabolic arch hinged at the supports and at the crown has a span of 24 m and a central rise of 4 m. It carries a concentrated load of 50 kN at 18 m from left support and a uniformly distributed load of 30 kN/m over the left half portion. Determine the moment, thrust and radial shear at a section 6 m from the left support. 12M

(OR)

5. A parabolic arch hinged at the springing and crown has a span of 20 m. The central rise of the arch is 4 m. It is loaded with a uniformly distributed load of intensity 2 kN/m on the left 8 m length. Calculate 12M

(i) The direction and magnitude of reaction at the hinges,

(ii) Bending moment, normal thrust and shear at 4m and 15m from left end.

UNIT-III

6. A horizontal cantilever of 6m long carries a u.d.l of 10 kN/m over the left half of the span. If the beam is propped at free end to the level of fixed end, find prop reaction and construct S.F and B.M diagrams. Also find the point of contraflexure. 12M

(OR)

7. A fixed beam of 8m span is loaded with two point loads of 50 kN at a distance 2m from both the end support. Draw the bending moment and shear force diagrams. Find also the maximum deflection. Given, $I = 8 \times 10^8$ mm^4 and $E = 2 \times 10^8$kN/m^2. 12M

UNIT-IV

8. A continuous beam has three successive spans of 4m, 7m, and 3m carries udl of 30kN/m, 20kN/m and 40kN/m respectively on the spans. Determine the bending moments and reactions at the supports. Beam has constant flexural rigidity. Draw S.F and B.M diagrams for the beam. 12M

(OR)

9. Derive the expression for clapeyron's theorem of three moments for a two spanned continuous beam. 12M

UNIT-V

10. A live load of 50 kN/m, 8m long moves on a simply supported girder of span 10m. Find the maximum B.M which can occur at a section 4m from left end. 12M

(OR)

11. A uniform load of 30kN/m, 5m long, crosses a girder 20m span. Calculate the maximum S.F and B.M at a section 8m from the left support. Also find the maximum shear and the absolute maximum B.M in the beam. 12M

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AR13

CODE: 13EE2012 SET-1

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

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 is the purpose of Economizer in a Steam power plant?
   b) What are the draw backs of a Thermal power station?
   c) What are the fuels for Gas turbine power plant?
   d) What is Nuclear Fission process?
   e) What is a radial distribution system?
   f) List out various equipment of a Distribution Substation.
   g) What is Load Duration curve?
   h) Define Tariff.
   i) List out major parts of a Cable?
   j) Why importance is given to Gas Insulated Substations in recent years?

PART-B

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

UNIT-I

2. Explain the functioning of following major components in thermal power plant. 12M
   (i) Fuel handling system (ii) Boiler (iii) Super heater (iv) Turbine
   (v) Cooling tower (vi) Electrostatic precipitator

(OR)

3. a) Briefly explain the factors that should be considered while selecting the site for Hydro electric plant. 6M
   b) Explain the operation of a Hydro electric power plant with a clear layout. 6M

UNIT-II

4. a) What are the merits of solar power generation system? 4M
   b) Write a short notes on various types of solar energy collectors? 8M

(OR)

5. a) Briefly explain Nuclear fission process. 4M
   b) Write a short notes on following nuclear reactor components. 8M
   (i) Moderator (ii) Control rods (iii) Coolant (iv) Reflectors

UNIT-III

6. a) Find out the voltage drop expression of a two wire DC distributor with a uniformly distributed load being fed at one end. 6M
   b) Differentiate between DC and AC distribution systems. What are the factors to be considered during the analysis of an AC distribution line? 6M

(OR)

7.	a)	Explain the factors to be considered while selecting the location of a substation.	6M
	b)	Mention the necessity of using following equipment in a substation. (i) Bus bars (ii) Circuit breakers (iii) Instrument transformers (iv) Power transformers	6M

UNIT-IV

8.	a)	Define the following terms. (i) Load factor (ii) Demand factor (iii) Plant capacity factor (iv) Plant utilization factor	6M
	b)	A generating station has the following maximum loads. 16000kW, 13000kW, 9000kW, 7000kW and 500kW. Maximum demand of the station is 23000kW. Annual load factor of the station is 50%. Calculate the diversity factor and number of units supplied by the plant annually.	6M

(OR)

9.	a)	What are the desirable characteristics of tariff structure?	6M
	b)	Explain any three types of tariff structures with their merits and demerits.	6M

UNIT-V

10.	a)	Derive the expression for dielectric stress in a cable. Explain how the potential gradient varies inside the cable.	6M
	b)	How to find out the optimal value of core diameter in a cable?	6M

(OR)

11.		Draw the single line diagram of a gas insulated substation indicating various equipment and components.	12M

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Code: 13ME2011 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.TECH II SEM REGULAR/SUPPLEMENTARY EXAMINATIONS, MAY, 2016

THERMAL ENGINEERING - I
(MECHANICAL ENGINEERING)

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

PART-A

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

1 a) What do you mean by lean mixture?
b) What is function of fuel injector?
c) What is meant by abnormal combustion?
d) What do you mean by ignition lag?
e) Define break power.
f) Define octane number.
g) Define indicated mean effective pressure.
h) Define volumetric efficiency.
i) Define slip factor.
j) Explain the principle of carburetion

. **PART B**

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

UNIT –I

2.a) Discuss the optimum opening position of exhaust valve to reduce the exhaust blow down loss. **5M**
b) With a neat sketch explain magneto ignition system. **7M**

(OR)

3.a) Explain the difference between actual and theoretical valve timing diagram of a four stroke petrol engine. **6M**
b) Derive an expression for air-fuel ratio of a simple carburetor **6M**

UNIT -II

4.a) Explain the various factors that influence the flame speed. **7M**
b) What are desirable characteristics of combustion chamber for SI engines. **5M**

(OR)

5.a) Explain the knock limited parameters **6M**
b) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation. **6M**

UNIT -III

6.a) Explain the phenomenon of knock in CI engine. **6M**
b) Explain swirl combustion chamber. **6M**

(OR)

7.a) Explain the factors that effect the delay period. **6M**
b) Explain pre-combustion chamber. **6M**

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Code: 13ME2011 **SET-1**

UNIT -IV

8. A six-cylinder, gasoline engine operates on the four-stroke cycle. The bore of each cylinder is 80mm and the stroke 100mm. The clearance volume per cylinder is 70cc. At a speed of 4000 rpm the fuel consumption is 20 kg/h and the torque developed is 150 Nm. Calculate i) the brake power ii) The brake mean effective pressure iii) The brake thermal efficiency if the calorific value of the fuel is 43000 kJ/kg iv) the relative efficiency on a brake basis assuming the engine works on the constant volume cycle. γ = 1.4 for air. **12M**

(OR)

9. A four stroke gas engine has a cylinder diameter of 25 cm and stroke 45 cm. The effective diameter of brake is 1.6 m. The observations made in a test of engine were as follows.

Duration of test = 40 min
Total number of revolutions = 8080
Total number of explosions = 3230
Net load on the brake = 90kg
Mean effective pressure = 5.8 bar
Volume of gas used = 7.5 m^3
Pressure of gas indicated in meter =136 mm water of gauge
Atmospheric temperature = 17^0 C
Calorific value of gas = 19 MJ/m^3 at NTP
Rise in temperature of jacket cooling water = 45^0 C
Cooling water supplied = 180 kg
Draw up a heat balance sheet and estimate the indicated thermal efficiency and brake thermal efficiency. Assume atmospheric pressure as 760 mm of Hg. **12M**

UNIT -V

10.a) Describe with a neat sketch the construction of a single –stage single-acting reciprocating air compressor. **6M**

b) An air compressor takes in air at 1 bar and 20^0 C and compresses it according to law $pv^{1.2}$= c It is then delivered to a receiver at a constant pressure of 10 bar. R = 0.287 kJ/kg K. Determine:

i) Temperature at the end of compression
ii) Work done and heat transferred during compression per kg of air **6M**

(OR)

11.a) Explain with neat sketch vane type blower compressor. **6M**

b) Derive the minimum work condition for stage compression. **6M**

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AR13

CODE: 13EE2013 SET-2

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.TECH II SEM REGULAR/SUPPLEMENTARY EXAMINATIONS, MAY, 2016

LINEAR CONTROL SYSTEMS
(Electronics and Communication Engineering)

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

PART-A

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

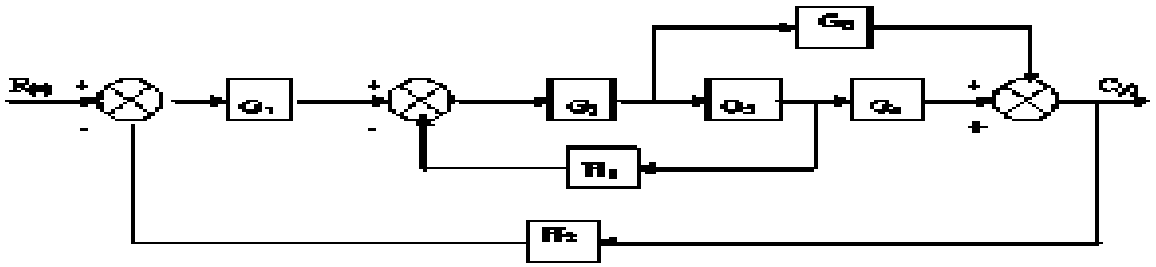
1. a) What are the advantages of closed loop control systems?
   b) Define loop
   c) List out the characteristics of a servo motor
   d) Define rise time
   e) What are the limitations of R-H criterion
   f) What is the angle criterion in root locus?
   g) Define resonant peak
   h) Define phase margin
   i) What are the different types of compensation?
   j) Define controllability

PART-B

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

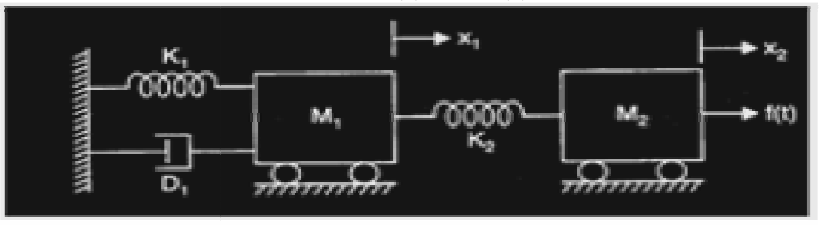
UNIT-I

2. a) Distinguish between feedback control system and feed forward control system **6M**
   b) Obtain the Transfer Function for the Block-Diagram Shown below **6M**



(OR)

3. a) What do you mean by the sensitivity of the control system and discuss the effect of feedback on sensitivity? **6M**
   b) Obtain the transfer function between $X_2(s)$ and $F(s)$? **6M**



AR13

CODE: 13EE2013 SET-2

UNIT-II

4. a) Derive the transfer function of synchros **6M**

b) Damping factor and natural frequency of the system are 0.12 and 84.2 rad/sec respectively. **6M**
Determine the rise time (t_r), peak time (t_p), maximum peak overshoot (M_p) and settling time (t_s).

(OR)

5. a) Define the steady state error and error constants of different types of inputs **6M**

b) Given the open loop transfer function of a servo system with unity feedback is **6M**
G(s) = $\frac{6}{s(1+0.2s)}$. Obtain the steady state error of the system when subjected to an input signal given by r(t) = $4 + 5t + 8t^2$

UNIT-III

6. For a unity feedback system having forward path transfer function **12M**
$G(s) = \frac{k}{s(1+0.6s)(1+0.4s)}$ find
   i) Marginal value of K and
   ii) Frequency of sustained oscillations

(OR)

7. Sketch the root locus plot of unity feedback system with an open loop transfer function $G(s) = \frac{k}{s(s+1)(s+5)}$. Find the range of K for the system to have damped oscillatory response. Determine the value of K so that the dominant pair of complex poles of the system has a damping ratio of 0.6. **12M**

UNIT-IV

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8 Given the open loop transfer function $G(s) = \frac{5}{(1+2s+s^2)(1+3s)}$. Sketch the Nyquist plot and investigate the open loop and closed loop systems stability **12M**

(OR)

9. For a unity feedback system,draw the bode log magnitude and phase plots of **12M**
$G(s) = \frac{s+3}{(s+2)(s^2+2s+25)}$ and judge the stability

UNIT-V

10. Design a phase lag network for a plant with the open loop transfer function to **12M**
$G(s) = \frac{5}{s(1+0.1s)^2}$ have a phase margin of 45^0. Verify the performance of the compensated system with the specification

(OR)

11. The state equation of a system is given by **12M**

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

i) Is the system controllable?
ii) Compute the state transition matrix
iii) Compute x (t) under zero initial condition and a unit step input

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AR13

CODE: 13CS2009 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech II Semester Regular / Supplementary Examinations, May-2016

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) Draw the DFA for L={01^n / n>=1 }
   b) Give me one key difference between Moore and Melay?
   c) Define epsilon closure?
   d) State the pumping lemma theorem for regular grammars?
   e) Construct F.A for R=01*?
   f) State any 2 closure properties of regular languages?
   g) Differentiate ambiguous and unambiguous grammars?
   h) What is meant by acceptance by empty stack in PDA ?
   i) Define churches hypothesis ?
   j) State PCP Problem ?

PART-B

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

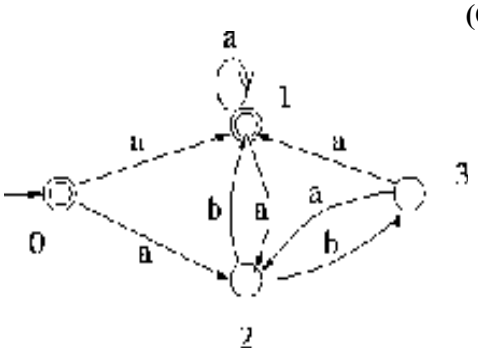
UNIT-I

2. Minimize the following FA

	a	b
q0	q1	q4
q1	q2	q3
q2	q7	q8
q3	q8	q7
q4	q5	q6
q5	q7	q8
q6	q7	q8
q7	q7	q7
q8	q8	q8

where q0 is starting state and q2, q3, q5, q6 are finals.

(OR)

3. 

Convert above NFA to DFA and verify the equivalence of string acceptance/ non acceptance?

AR13

CODE: 13CS2009 SET-2

UNIT-II

4. Construct FA for R= (01+10+00)*11(01+10+00)* and show the acceptance or non acceptance of string ?

(OR)

5. Minimize following regular expressions 1+10*0*+[(00+11)*+(00+11)*]*+11*+11*(00+1+1+10+0)*+1100+1100+1*.and draw the equivalent FA for the minimized regular expression ?

UNIT-III

6. a) Differentiate RLG and LLG grammars with examples?
   b) List out the enumeration properties of CFL ?

(OR)

7. Construct equivalent GNF for P: S->AA/ a A-> SS/b where V={S,A } T={a,b}.

UNIT-IV

8. Design PDA for L={ pow(a,n) pow(b,n) / n>=1 } and verify the acceptance or non acceptance of following strings (i) aabb (ii) aaabbb (iii) aaaabbbb.

(OR)

9. Construct PDA for L=(WCW^R / W from (a + b)* }

UNIT-V

10. Design TM for L={ a^nb^n / n>=1 } and verify the strings aabb , aaabbb with T.M ?

(OR)

11. a) Find out the PCP Solution for (a,bbb) (b,aaa) (aaaaa,bbbbbbbbb)
    b) Draw the Chomsky hierarchy of languages Block Diagram and highlight its features?

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