AR13 SET-2

Code: 13CE2008

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, August-2015

STRUCTURAL ANALYSIS-I
(CIVIL ENGINEERING)

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

PART-A

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

1. a) Write the equation of statics.
   b) What is meant by propped cantilever beam.
   c) What is the response of three hinged arch to the changes in temperature?
   d) Determine the degree of static in determinacy of a propped cantilever.
   e) Write the fixed end moments for a fixed beam subjected to concentrated load at 'a" from support A and 'b' from support B.
   f) Define point of contraflexure. Show the point of contra flexures for a fixed beam subjected to udl through out it's length.
   g) Two wheel loads 80 kN and 200 kN spaced 2 m apart moves on a girder of span 16 m. Find maximum negative shear force at a section 4 m from left end. Any load can lead other.
   h) What is the prop reaction of a propped cantilever beam subjected to point load at center
   i) Write the advantages and disadvantages of fixed beams
   j) Write theorem of three moments equation for a continuous beam has different levels.

PART-B

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

UNIT-I

2. Analysis the truss shown in fig 1. Determine the forces in all the members.

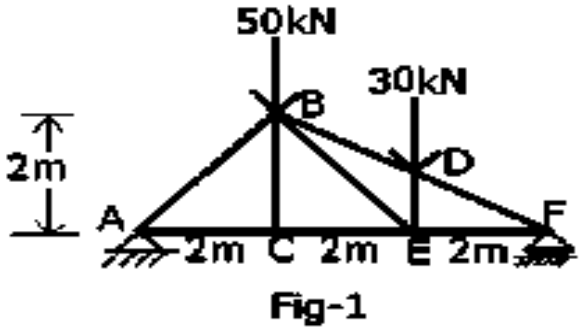

Fig-1

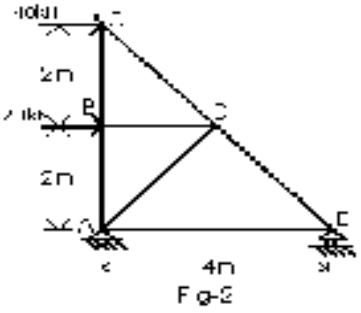

Fig-2

(OR)

3. Analysis the truss shown in fig. 2. Find the forces in all the members.

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UNIT-II

4. A three hinged segmental arch has a span of 50 m and central rise of 8 m. A point load of 100 kN acting at 15 m measured horizontal from right support. Determine the horizontal thrust developed at the supports, the bending moment, Normal thrust and radial shear at a section 15 m from the left hand support.

(OR)

5. A three hinged parabolic arch of span 50 m and central rise 20 m carries a uniformly distributed load of 50 kN/m on horizontal AC and two point loads 100 kN each at 5 m and 10 m from B. Determine the horizontal thrust, Normal thrust and radial shear and bending moment at point D 15 m from A.

UNIT-III

6. Determine the support moments, reactions and draw bending moment diagram & shear force diagram for the beam shown in fig. 3

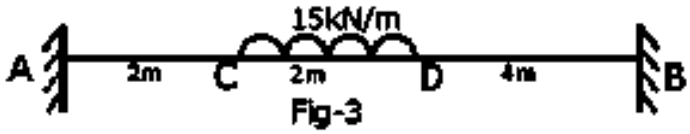

Fig-3

(OR)

7. Determine the support moments, reactions and draw bending moment diagram & shear force diagram for the beam shown in fig. 4

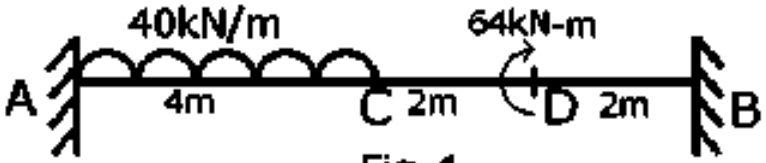

Fig-4

UNIT-IV

8. Analysis the continuous beam loaded as shown in fig. 5, using Clapeyron's theorem of three moments method and draw the bending moment and shear force diagrams.

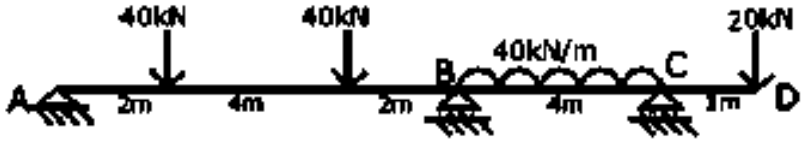

Fig-5

(OR)

9. Analysis the continuous beam shown in fig. 6. Using Clapeyron's theorem of three moments method. Draw shear force and bending moment diagrams.

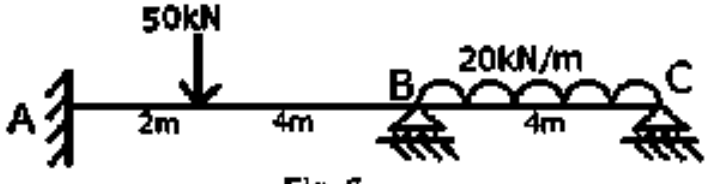

Fig-6

Code: 13CE2008

UNIT-V

10. Draw influence line diagram for reactions at supports A, B and C and bending moment at support B for the beam shown in fig. 7. There is a hinge provided at D. Find their maximum values when a travelling load of 60 kN per m may cover any part of span.

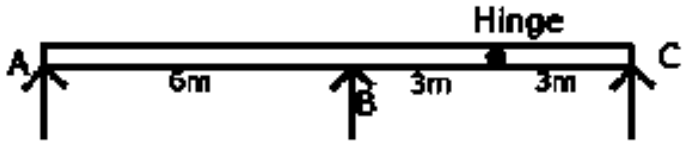

Fig-7

(OR)

11. A train of wheel loads as shown in Fig. 8 crosses a simply supported beam of span 24 m from left to right. Calculate the maximum positive and negative shear force values at the center of the span and the absolute maximum bending moment anywhere in the span .

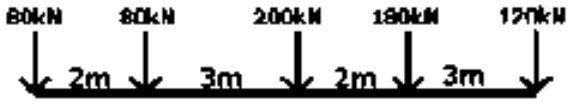

Fig.8

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AR13 SET-2

Code: 13EE2012

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, August-2015

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 function of surge tank in hydro electric power plant?
   b) What is function of condenser in thermal power plant ?
   c) What is the use of coolants in nuclear power plant?
   d) Define the Plant Use Factor
   e) How does a load duration curve differ from chronological load curve?
   f) What are the advantages of high voltage transmission?
   g) What is the purpose of Moderator in a Nuclear Power Reactor?
   h) State the properties of a good insulating material?
   i) What are the practical difficulties in grading of cable?
   j) Write the advantages of Gas Insulated substations?

PART-B

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

UNIT-I

2. Draw the line diagram of thermal power Station explaining each and every component [12M]

(OR)

3. a) Explain briefly about the Cooling Towers and Boilers [6M]
   b) How are Hydro electric power plants classified? [6M]

UNIT-II

4. Explain with the help of a neat diagram the working of a Boiler Water Reactor used in a nuclear power plant [12M]

(OR)

5. a) Explain the Principle operation of Solar Power Generation [6M]
   b) Compare the Thermal and Fast Breeder Reactor [6M]

UNIT-III

6. A 2-wire DC ring main, having the loading at points C,D and E is fed at point B from the feeder AB as shown in Fig.1. If the cross section area of the feeder is a cm^2 and that of the distributor is b cm^{2,} find the values of a and b for minimum volume of copper in the system. Given that the maximum drop from A does not to exceed 10Volt. The length of the feeder AB is 500m and the length of distributors BC, CD, DE and EB are 200, 150, 120 and 70m respectively. Take resistivity of copper is 1.7μΩ-cm. [12M]

Code: 13EE2012

(OR)

7. a) Explain the differences between AC and DC Distribution? [6M]
   b) Write the advantages of Ring Mains Systems? [6M]

UNIT-IV

8. a) What do you understand by Tariff? Discuss the objectives of tariff [4M]
   b) The yearly load duration curve of a power plant is a straight line. The maximum load is 500MW and the minimum load is 400MW. The capacity of the plant is 750MW. Find (i) Plant Capacity Factor (ii) Load Factor (iii) Utilization Factor (iv) Reserve Capacity [8M]

(OR)

9. a) Define the following terms
   (i) Connected Load (ii) Diversity Factor (iii) Demand Factor [6M]
   b) Explain 2-Part Tariff, 3-Part Tariff and Power Factor Tariff Methods [6M]

UNIT-V

10. a) Prove that the ratio of gradient with and without intersheath will be $2/(1+\alpha)$, when there is only one layer [8M]
    b) Show that the insulation resistance of a cable is inversely proportional to its length [4M]

(OR)

11. a) Draw the single line diagram of Gas Insulated Sub Station [5M]
    b) A single core cable has a conductor of diameter 3cm and inside diameter of lead sheath is 6cm. If the cable is designed for operating voltage of 33kV(line to neutral), find (i) Maximum and Minimum Values of Electric Stress (ii) Optimal value of conductor radius for the smallest value of the maximum stress. [7M]

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AR13 SET-2

Code: 13ME2011

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, August-2015

THERMAL ENGINEERING - I
(MECHANICAL ENGINEERING)

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

PART-A

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

1. a. Why actual thermal efficiency is lower than air standard efficiency?
   b. List two basic functions of a Carburettor.
   c. List some of the requirements of fuel supply system of CI engines.
   d. What is Pre-ignition?
   e. What are the dopes used in SI engine fuels to reduce knocking?
   f. What is Ignition delay period in CI engines?
   g. Define Brake thermal efficiency and Specific fuel consumption.
   h. Define Volumetric efficiency and Isothermal efficiency as applied to Reciprocating compressors.
   i. What is Surging and Choking? .
   j. What is polytropic efficiency?

PART-B

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

UNIT-I

2. (a) List out the major losses that occur in actual engine operation. [4M]
   (b) Write short notes about (i) Heat loss factors (ii) Exhaust blow down [8M]

(OR)

3. (a) Briefly explain the working of 4 stroke CI engine with the help of simplified cycles. [6M]
   (b) Make a comparison between 4 stroke and 2 stroke engines. [6M]

UNIT - II

4. (a) Briefly explain about the normal combustion in SI engines. [6M]
   (b) What is meant by knocking? Discuss the factors responsible for knocking in SI engines.. [6M]

(OR)

5. (a) Write a short note on required qualities of SI engine fuels and its rating. [6M]
   (b) What are the requirements of Combustion chamber for SI engines and discuss any one type of combustion chamber used for SI engines with a neat sketch. [6M]

Code: 13ME2011

UNIT – III

6. What is ignition delay period? Explain how it responsible for detonation in CI engines. [12M]

(OR)

7. (a) Discuss the factors affecting detonation in CI engines. [6M]
   (b) Discuss briefly about open and divided combustion chambers used in CI engines. [6M]

UNIT – IV

8. The following observations were recorded during a trial of a four stroke,single cylinder oil engine. Duration of trial is 30 min. Oil consumption is 4 litres. Calorific value of the oil is 43 MJ/kg. Specific gravity of the fuel = 0.8 average area of the indicator diagram = 8.5 cm^2. Length of the indicator diagram = 8.5 cm, Spring constant = 5.5 bar/cm. Brake load = 150 kgf. Spring balance reading = 20 kgf. Effective brake drum wheel diameter = 1.5 m Speed = 200 rpm. Cylinder diameter = 30cm. Stroke = 45 cm. Jacket cooling water = 10 kg/min. Temperature rise is 36 ^{0}C.
   Calculate (i) indicated power (ii) brake power (iii) mechanical efficiency
   (iv) brake specific fuel consumption in kg/kW h and (v) indicated thermal efficiency. [12M]

(OR)

9. In a test of a four cylinder , four stroke petrol engine of 75 mm bore and 100 mm stroke, the following results were obtained at full throttle at a constant speed and with a fixed setting of the fuel supply o 0.82 kg/min. BP with all cylinders working = 15.24 kW BP with cylinder number 1 cut-off = 10.45 kW BP with cylinder number 2 cut-off = 10.38 kW BP with cylinder number 3 cut-off = 10.23 kW BP with cylinder number 4 cut-off = 10.45 kW . Estimate the indicated power of the engine under these conditions. If the calorific value of the fuel is 44 MJ/kg, find the indicated thermal efficiency of the engine. Compare this with the air standard efficiency, the clearance volume of one cylinder being 115 cc. [12M]

UNIT - V

10. (a) Give a detailed classification of Compressors based on various considerations. [6M]
    (b) Derive an expression for volumetric efficiency of a reciprocating compressor in terms of suction and free air conditions. [6M]

(OR)

11. (a) Make a comparison between Centrifugal & axial flow compressors. [6M]
    (b) An eight stage axial flow compressor provides a overall pressure ratio of 6:1 with an overall isentropic efficiency 90 % when the temperature of air at inlet is 20 ^{0}C. The work is divided equally between the stages. A 50 % reaction design is used with a mean blade speed 188 m/s and a constant axial velocity 100 m/s through the compressor. Estimate the power required and blade angles. Assume air to be a perfect gas for which C_p = 1.005 kJ/kg K and k = 1.4 [6M]

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AR13 SET-2

Code: 13EE2013

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, August-2015

LINEAR CONTROL SYSTEMS

(ELECTRONICS AND COMMUNICATION ENGINEERING)

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

PART-A

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

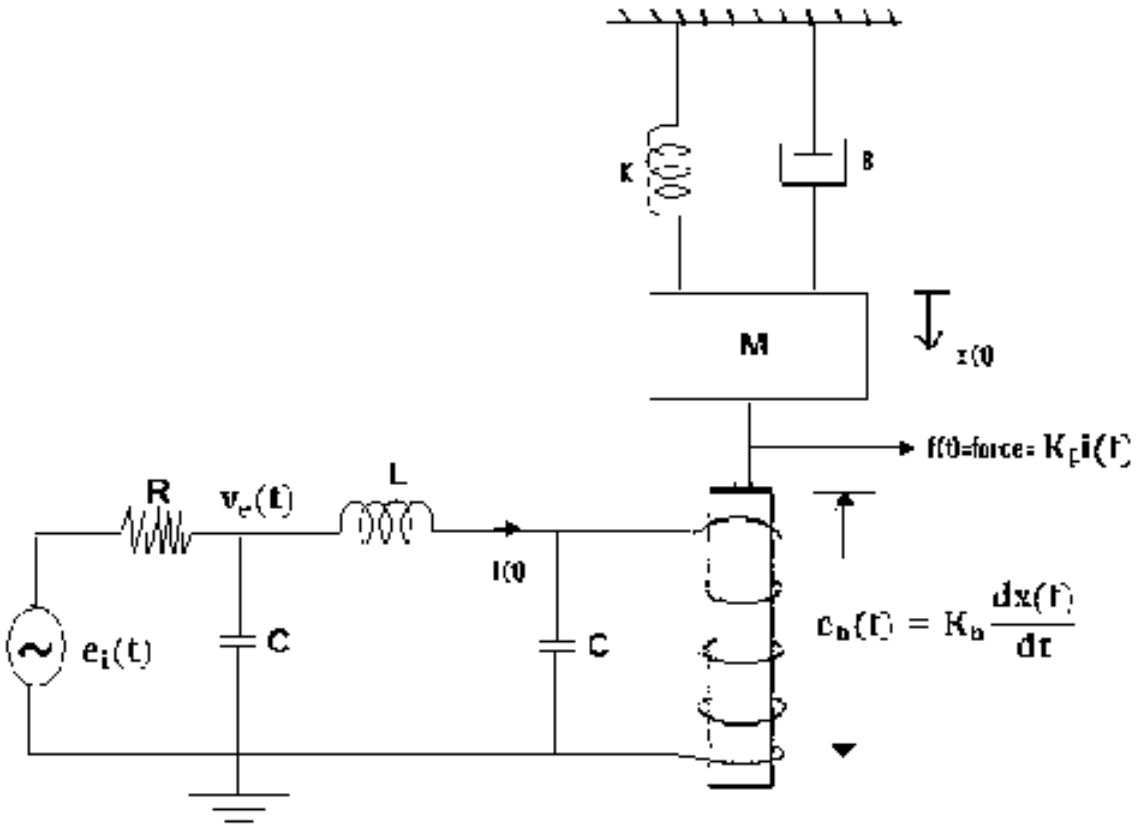
1. a) Write two disadvantages of closed loop system
   b) How do you eliminate feed back path in a block diagram?
   c) What are the test signals in control systems?
   d) Write any two transient specification of response of second order system in control systems
   e) Write the expression for band width in frequency domain for second order control system
   f) If all the elements of Routh's array in one of the rows become zero. What is the indication about stability?
   g) Where will root loci start in root locus diagram?
   h) How do you find stability of the system from Bode plots?
   i) Write the transfer function for load compensator if $\propto$=0.1 and T=10
   J) Write the condition to be satisfied for complete observability of the system.

PART-B

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

UNIT-I

2) Find the transfer function x(s)/E(S) for the electro mechanical system shown below. [12 M]

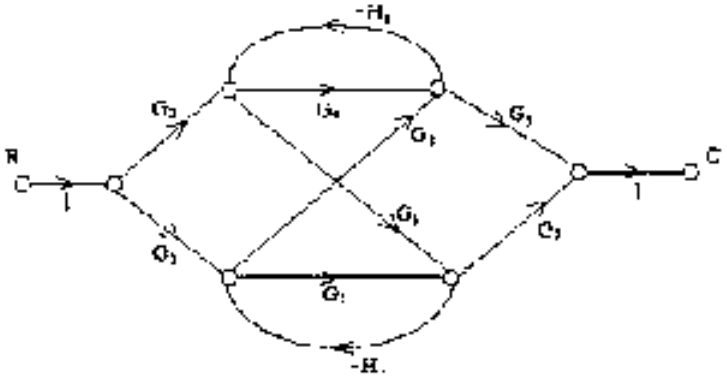


AR13 SET-2

Code: 13EE2013

(OR)

3. Obtain the over all transfer function c(s) /R(s) from the signal flow graph shown below [12M]



UNIT-II

4. a) Derive the transfer function of A.C. Servo Motor [6M]
   b) Derive the transfer function of field controlled D.C. servo motor [6M]

(OR)

5. A servo mechanism is used to control the angular position θ_0 of a mass through a command signal θ_c the moment of inertia of moving parts referred to the load shaft is 200 kg $-m^2$ and the motor torque at the load is 6.88 $x10^4$ newton –m per rad of error. The damping torque coefficient refered to the load shaft is $5x10^3$ newton –m per rad/sed. Find the time response of the servo mechanism to a step input of 1 rad and determine the frequency of transient oscillations, the time to rise to the peak overshoot and the value of the peak overshoot. [12M]

UNIT-III

6. The characteristic equations for certain feedback control system are given below. Determine the range of values of k for the system to be stable given in and number of roots that are in the right half of the s-lane for
   (a) $s^3+3ks^2+(k+2)s+4=0$ [6M]
   (b) $s^5+s^4+3s^3+9s^2+16s+10=0$ [6M]

(OR)

7. Skatch the root locus plot of a unity feedback system with an open loop transfer function $G(S) = \frac{K}{S(S+2)(S+4)}$ Find the range of values of K for which the system has damped oscillatory response. Determine the frequency of continuous oscillations.Determine the values of K so that the dominant pair of complex poles of the system has a damping ratio of 0.5 Corresponding to this value of K, determine the closed loop transfer function in factored form. [12M]

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Code: 13EE2013

UNIT-IV

8. Draw Bode plots for the transfer function G(S) = $\frac{6(S+2)}{S(S+0.5)(S^2+3.2S+64)}$ Also determine the value of gain and phase margins and hence stability. [12M]

(OR)

9. Draw Nyquist plot for the system whose open loop transfer function G(S) H(s) = $\frac{(4s+1)}{s^2(1+s)(1+2s)}$ Also determine the number of characteristic roots that are lying in the right half of the S plane and hence stability of the system. [12M]

UNIT-V

10. Design a lead compensator for the system whose open-loop transfer function G(S) = $\frac{K}{S(S+1)}$ to satisfy the following specifications. K_V=12 sec^{-1}, phase margin=40^0 , use Bode plots [12M]

(OR)

11. a) Develop the state model of linear time invariant systems
    b) Determine the state controllability and observability of the following system

$$A=\begin{bmatrix}-1 & 0\\ 0 & -4\end{bmatrix}\ B=\begin{bmatrix}0\\ 1\end{bmatrix}\ C=[1 \quad 3],$$

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Code: 13CS2009

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech II Semester Supplementary Examinations, August-2015

FORMAL LANGUAGES AND AUTOMATA THEORY
(COMMON TO CSE & IT)

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

PART-A

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

1. a) Give the Formal definition of Push Down Automata
   b) Specify an example for finite set
   c) Define Dead State
   d) Differentiate P and NP problems
   e) Define Pumping Lemma for regular sets
   f) Is $a^n b^n$ Regual languages?
   g) What is Cross Sequencing?
   h) Define CFG
   i) What is an ambiguous grammar?
   j) Give an application of Turing Machine.

PART- B

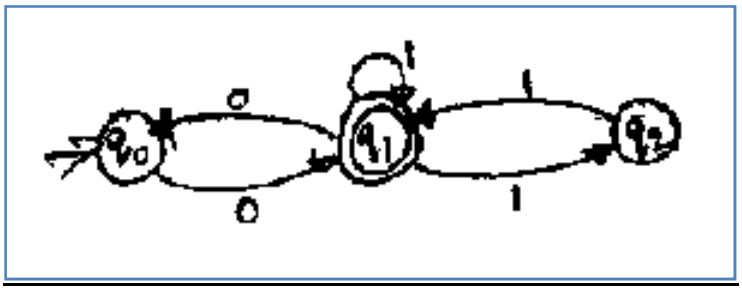
Answer one question from each unit **[5X12=60M]**

UNIT-I

2. a) Show that if L is a regular language then the set of strings in L of odd length is also a regular language. Is the same true of strings of even length? Justify your answer.
   b) Construct finite automata for accepting the strings ending with 10*01(11)*.

(OR)

3. a) Convert the following NFA to DFA



   b) Design a Mealy Machine for following
   i) If input is 10, 01,11 produce output as 1 ii) if input is 00 produce output as 0.
   [note: Mealy machine for AND operation]

UNIT - II

4. Prove the following identities for regular Expressions r,s, and t. Here r=s means L(r)= L(s).

   i) r+s= s+r ii) (r+s)+t=r+(s+t) iii) (rs)t= r(st) iv) r(s+t)= rs+rt

   v) (r*)* = r* vi) (r*s*)= r+s)*

(OR)

5. a) Define right linear grammar and left linear grammar
   b) Explain about pumping lemma for regular sets

UNIT - III

6. a) Construct a CFG generating the set

   $$\{WCW^R \mid W \text{ in}(0+1)\}^*$$

   b) What are closure properties of Context free languages?

(OR)

7. a) Consider the following grammar ({S,A,B}, {c,d}, P,S) that has the following Productions:
   E->E+E/E-E
   E->E*E/id
   Find the equivalent unambiguous grammar
   b) Give context free grammar for well balanced parenthesis

UNIT - IV

8. a) What is Pushdown Automata
   b) Give the differences between PDA and FA

(OR)

9. a) Design Push Down automata for accepting the Language $a^nb^n \mid n>=1$
   b) What are the limitations of PDA

UNIT - V

10. a) Construct Turing Machine L={ a^n b^n $c^n \mid$ n belongs to 0,1}
    b) What is turing theorem?

(OR)

11. Explain about NP hard and NP complete Problems

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