

AR13

CODE: 13CE2006

SET-2

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

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

STRENGTH OF MATERIALS-II (CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[10 x 1 = 10 M]

1. a) Define thin cylinder
b) The hoop stress of thin spherical shell is ----
c) The radial pressure for a thick cylinder is given by-----
d) Give the method for reducing hoop stress for thick cylinder
e) Define principal planes
f) Define term obliquity
g) Define polar modulus
h) Define Torsional rigidity
i) Define term crippling load
j) What is equivalent length of a column

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. A cylindrical vessel is 1.5m diameter and 4m long is closed at ends by rigid plates. It is subjected to an internal pressure of 3N/mm^2 . If the maximum principal stress is not to exceed 150 N/mm^2 , find the thickness of the shell. Assume $E = 2 \times 10^5\text{ N/mm}^2$ and poisson's ratio = 0.25. Find the changes in diameter, length and volume of the shell?

(OR)

3. Show that in thin cylinder shells subjected to internal fluid pressure, the Hoop stress is twice the longitudinal stress?

UNIT-II

4. Find the thickness of a metal necessary for a cylindrical shell of internal diameter 160 mm to withstand an internal pressure of 8 N/mm^2 . The maximum hoop stress in the section is to exceed 35 N/mm^2 ?

(OR)

5. A thick spherical shell of 200mm internal diameter is subjected to an internal fluid pressure of 7 N/mm^2 . If the permissible tensile stress in the shell material is 8 N/mm^2 , find the thickness of the shell?

UNIT-III

6. The Principal stresses at a point in a bar are 200 N/mm^2 (tensile) and 100 N/mm^2 (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 60° to the axis of the major principal stress. Also determine the maximum intensity of shear stress in the material at that point.

(OR)

7. An elemental cube is subjected to tensile stresses of 30 N/mm^2 and 10 N/mm^2 acting on two mutually perpendicular planes and a shear stress of 10 N/mm^2 on these planes. Draw the Mohr's circle of stresses and determine the magnitude and direction of principal stresses and also the greater shear stress.

UNIT-IV

8. Derive the torsion equation with usual notations.
(OR)
9. A solid steel shaft transmits 100 kW at 150 rpm. Determine the suitable diameter of the shaft if the maximum torque transmitted exceeds the mean by 20% in each revolution. The shear stress is not to exceed 60 MPa. Also find the maximum angle of twist in a length of 4m of the shaft. Take $G = 80 \text{ GPa}$.

UNIT-V

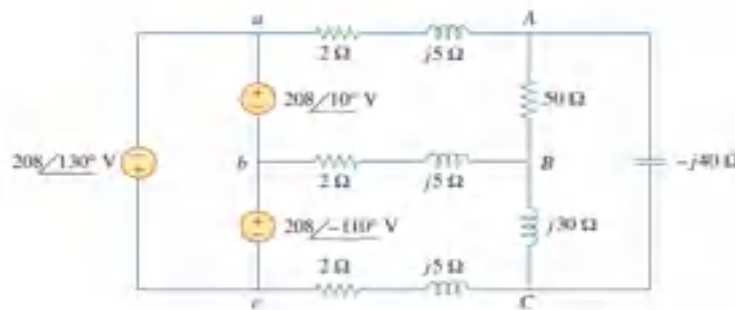
10. A 1.5 m long column has a circular cross-section of 5 cm diameter. One of the ends of the column is fixed in direction and position and the other end is free. Taking factor of safety as 3, calculate the safe load using.
(i) Rankin's formula. Take yield stress $\sigma_c = 560 \text{ N/mm}^2$ and $\alpha = 1/1600$ for pinned ends.
(ii) Euler's formula. Take $E = 1.2 \times 10^5 \text{ N/mm}^2$.
(OR)
11. A column of circular section is subjected to a load of 120 kN. The load is parallel to the axis but eccentric by an amount of 2.5 mm. the external and internal diameters are 60 mm and 50 mm respectively. If both the ends of the column are hinged and column is 2.1 m long, determine the maximum stress in the column. Take $E = 200 \text{ GN/m}^2$

**ELECTRICAL CIRCUIT ANALYSIS-II
(Electrical and Electronics Engineering)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) If 2 wattmeters read 500W and -250W find the power factor
- b) What is the relationship between the line voltages and line currents in delta and star connected system
- c) What are the conditions for a function to be Hurwitz
- d) What do you mean by neutral ground shifting
- e) How can you say that a system is stable
- f) Define time constant of a circuit
- g) How are the roots of under damped system in a series RLC circuit excited with AC
- h) What is the difference high pass filter and low pass filter
- i) What is the function of filter
- j) What is the resonant condition to design a filter

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

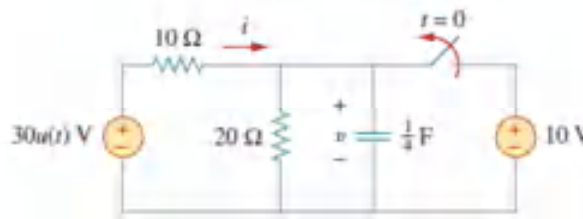
2. a) A balanced delta connected load having an impedance $20-j15\Omega$ is connected to a delta connected, positive-sequence generator having $V_{ab} = 330V$ Calculate the phase currents of the load and the line currents. **5M**
 - b) How many wattmeters are required to measure a three phase balanced or unbalanced system power justify **7M**
- (OR)**
3. For the unbalanced circuit in Fig.ure shown below find the line currents and phase currents **12M**

**UNIT-II**

4. a) In the circuit shown in Figure find V_0 and i_0 for all time, assuming that the switch was open for a long time **6M**

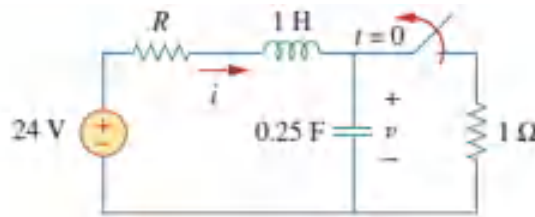


- b) In Figure the switch has been closed for a long time and is opened at $t = 0$. Find i and v for all time. **6M**



(OR)

5. For the circuit in Fig find $v(t)$ and $i(t)$ for $t > 0$. Consider these cases for $R=5\Omega$, 4Ω and 1Ω **12M**

UNIT-III

6. Derive the expression for transient response in a series R-L-C circuit for AC excitation. Obtain the solution. **12M**

(OR)

7. In the series RC circuit $R=500\Omega$, and $C=0.5\mu\text{F}$ applied with $v(t) = 100\sin(1000t+\Phi)\text{V}$ at $\Phi = 45^\circ$ and the capacitor has an initial charge of $25\mu\text{C}$ find the current **12M**

UNIT-IV

8. Check whether the following function is Hurwitz or not **12M**
 $P(s) = 4s^6 + 2s^5 + 17s^4 + 8s^3 + 16s^2 + 6s + 3$

(OR)

9. An Impedance is given below find the Foster form-I and II **12M**

$$Z(s) = \frac{2(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$

UNIT-V

10. Derive the expressions for all parameters of a K-Type High pass filter. Obtain the solution **12M**

(OR)

11. a) Explain about band Elimination filter **6M**
 b) Design a band elimination filter with nominal impedance $R_0 = 500\Omega$ and cut-off frequency of 5KHz and 10KHz **6M**

**KINEMATICS OF MACHINERY
(MECHANICAL ENGINEERING)****Time: 3 Hours****Max Marks: 70****PART-A****ANSWER ALL QUESTIONS****[1 x 10 = 10 M]**

1. a) Define Degrees of Freedom of a Kinematic pair
- b) What is Kutzbach's criterion for plane mechanisms?
- c) Give any one example for lower and higher pairs.
- d) Write down the condition for correct steering
- e) Write any one application of Universal coupling.
- f) What is coupler curve?
- g) Write any one difference between centrode and axode
- h) What is backlash in gear terminology?
- i) What do you mean by a gear train?
- j) What is the working principle of a sliding gear box?

PART-B**Answer one question from each unit****[5x12=60M]****UNIT-I**

2. Enumerate the inversions of a double-slider-crank chain with neat sketches. Give examples 12M

(OR)

3. a) Differentiate between Whitworth quick return motion mechanism and crank and slotted lever mechanism 8M
- b) Explain for determining degree of freedom for mechanism. Using Grubler's criterion for plane mechanism, prove that the minimum number of binary links in a constrained mechanism with simple hinges is four. 4M

UNIT-II

4. a) Explain the working of a Scott-Russell mechanism with neat sketch. 5M
- b) The two shafts of a Hooke's coupling have their axis inclined at 20° . The shaft A revolves at a uniform speed of 1000 rpm. The shaft B carries a fly wheel of mass 30 Kg. if the radius of gyration of the fly wheel is 100 mm, find the maximum torque in the shaft B. 7M

(OR)

5. a) For an Ackermann steering gear, derive the expression for the angle of inclination of the track arms to longitudinal axis of the vehicle. 9M
- b) Briefly explain about pantograph. 4M

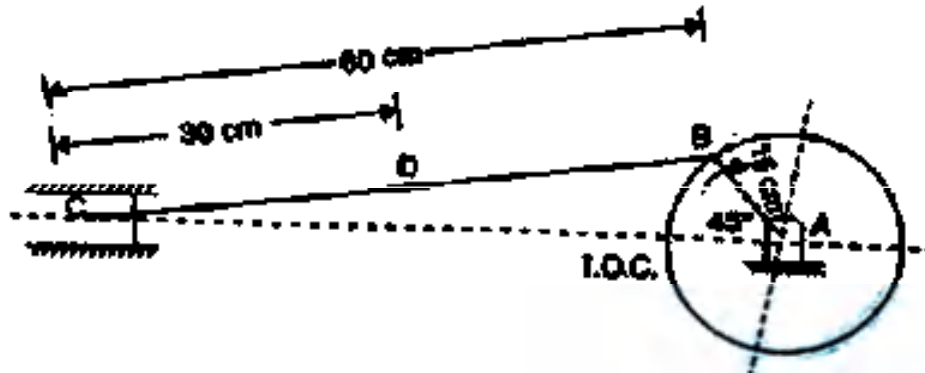
UNIT-III

6. a) Explain the existence of Coriolis component of acceleration using an appropriate sketch 5M
- b) A link OS is rotating about point O. At a particular instant when $\theta=90^\circ$ PoP with x-axis, the angular velocity of the link is 2 rad/s (CCW) and the angular acceleration is 5 rad/s² (CCW). A slider P is sliding along the link radially outward, and at that instant, the distance of the slider from point O is 2m (distance OP=2m). The corresponding point on the Link is Q. The velocity and acceleration of the point P at that instant w.r.t. Q are 3m/s and 4m/s² both radially outwards. Find the acceleration of point P relative to point O using an acceleration diagram. Also find (i) The acceleration of Q relative to O
(ii) acceleration of P relative to Q 7M

(OR)

1 of 2

7. a) The crank of slider crank mechanism shown in Figure below is 15cm and the connecting rod is 60 cm long. The crank makes 300 r.p.m. in the clockwise direction. When it has turned 45° from the inner dead centre position, determine: (i) velocity of slider C, (ii) Angular velocity of connecting rod and (iii) Linear velocity of the mid-point of the connecting rod. 12M



UNIT-IV

8. A cam with a minimum radius of 25 mm is to be designed for a knife-edge follower with the following data: 12M
- To raise the follower through 35 mm during 60° rotation of the cam
 - Dwell for next 40° of the cam rotation
 - Descending of the follower during the next 90° of the cam rotation
 - Dwell during the rest of the cam rotation
- i) Draw the profile of the cam if the ascending and descending of the cam is with simple harmonic motion and the line of stroke of the follower is offset 10 mm from the axis of the cam shaft.
- ii) What is the maximum velocity and acceleration of the follower during the ascent and the descent if the cam rotates at 150 rpm?

(OR)

9. Construct the profile of a cam to suit the following specifications: cam shaft diameter=40 mm; least radius of cam=25 mm; diameter of roller=25 mm; angle of lift= 120° ; angle of fall= 150° ; lift of the follower=40 mm; number of pauses are two of equal interval between motions. During the lift, the motion is simple harmonic motion. During the fall the motion is uniform acceleration and deceleration. The speed of the cam shaft is uniform. The line of stroke of the follower is off-set 12.5 mm from the centre of the cam 12M

UNIT-V

10. a) Explain the terms arc of contact and path of contact with suitable sketches 5M
- b) An epicyclic gear train consists of an arm and two gears A and B having the 30 and 40 teeth respectively. The arm rotates about the centre of the gear A at a speed of 80 rpm counter-clockwise. Determine the speed of the gear B if 7M
- (i) the gear A is fixed, and
 - (ii) the gear A revolves at 240 rpm clockwise instead of being fixed

(OR)

11. a) Describe various types of gears used for connecting parallel shafts. 6M
- b) The velocity ratio of two spur gears in mesh is 0.4 and the centre distance 75mm. For a module of 1.2mm, find the number of teeth of the gears. What will be the pitch line velocity if the pinion speed is 800 rpm? Also find the speed of the gear wheel 6M

AR13

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SET-1

**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)**

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

**PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)**

Time: 3 Hours

Max Marks: 70

PART-A

ANSWER ALL QUESTIONS

[1 x 10 = 10 M]

1. a) Draw the response of RC high pass circuit for a square input signal.
b) Mention any two applications of comparators.
c) Draw the circuit and output waveform of slicer circuit.
d) What is the function of restorer.
e) Define Forward recovery time.
f) Which multivibrator is used as a memory element. Why?
g) What is the need of commutating capacitors used in multivibrators ?
h) Mention any two applications of Schmitt trigger
i) Define rise time and fall time?
j) What are the applications of sampling gates.

PART-B

Answer one question from each unit

[5x12=60M]

UNIT-I

2. a A pulse of 10 V amplitude and 0.5ms duration is applied to an RC high pass circuit with $R=22\text{ K}\Omega$ and $C=0.47\text{ }\mu\text{F}$. Sketch the output waveform and determine the percentage tilt in the output. **7 M**
b Explain briefly about Ringing circuits. **5 M**
(OR)
3. a Show that low pass RC circuit performs as a perfect integrator for $RC \geq 15T$. **5 M**
b Derive the condition for perfect compensation of an attenuator. **7 M**

UNIT-II

4. a Design the clipping circuit with ideal components and generate the waveform shown in figure **7 M**



- b What is the need for clipping circuits. Explain about series and shunt noise clippers. **5 M**

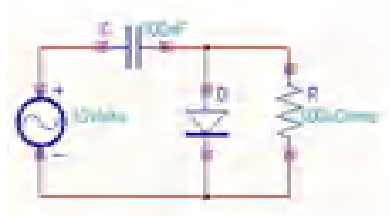
(OR)

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SET-1

5. a State and Prove Clamping circuit theorem. **7 M**
b Identify the type of clamper circuit shown and explain its operation with input and output waveforms. **5 M**



UNIT-III

6. a A collector coupled fixed-bias binary uses n-p-n transistors with $h_{fe} = 20$. The circuit parameters are $V_{CC} = 12V$, $V_{BB} = 3V$, $R_c = 1k\Omega$, $R_1 = 5k\Omega$, $R_2 = 10k\Omega$, $V_{CE(Sat)} = 0.4V$, and $V_{BE(Sat)} = 0.8V$. Find the stable state voltages and currents. **8 M**
b Explain the operation of SCHMITT Trigger . **4 M**

(OR)

7. a Explain the transistor switching times with neat response and necessary definitions. **8 M**
b Explain the behavior of a BJT as a switch. Give Applications. **4 M**

UNIT-IV

8. a Design an Astable Multivibrator to generate 5 KHz square wave. The supply voltage $V_{CC} = 10V$, $I_{C(sat)} = 10mA$, $h_{fe} = 50$ and assume Si transistors. **6 M**
b Explain the operation of emitter coupled Monostable multivibrator with neat waveforms . **6 M**

(OR)

9. a Explain the basic principle and working of bootstrap sweep circuit. **6 M**
b In a current sweep circuit, explain how linearity correction is made through adjustment of driving waveform. **6 M**

UNIT-V

10. a Explain the working of diode controlled Astable blocking oscillator. **6 M**
b Explain the working of monostable blocking oscillator with emitter timing. **6 M**
(OR)
11. a What are the advantages of unidirectional sampling gates? Explain with neat circuit diagram operation of bidirectional gates? **6 M**
b Explain the working of two diode sampling gate. **6 M**

Code: 13CS2007**ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)****II B.Tech II Semester Regular / Supplementary Examinations, May-2016****DATABASE MANAGEMNET SYSTEMS
(COMMON TO CSE & IT)****Time: 3 Hours****Max Marks: 70****PART-A****Answer all questions****[1 x 10 = 10M]**

1. a) What do you mean by weak entity set?
b) What does it mean by Metadata?
c) What is virtual table?
d) Define ISAM?
e) How to modify the table structure?
f) What is a trigger?
g) Define normalization.
h) Define entity.
i) What do you mean by durability of transaction?
j) What is a primary key?

PART-B**Answer one question from each unit****[5X12=60M]****UNIT-I**

2. a) How DBMS is different from traditional file approach. [8M]
b) What is DBA? What are the responsibilities of DBA? [4M]
- (OR)
3. a) Distinguish between logical and physical data independence. Illustrate them with an example. [8M]
b) Explain different database languages. [4M]

UNIT-II

4. A bank has many branches and a large number of customers. A customer can open different kinds of accounts with the bank. The bank keeps track of customers by SSN, name, address, phone number. There are different types of loans each is identified by a loan number. A customer can take more than one loan and all branches can give loans. Loans have duration and interest rate. The account holder can enquire about the balance in his account. Create an ER model for the bank. [12M]

(OR)

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5. a) Describe entity integrity and referential integrity constraints with examples. [8M]
b) Explain selection and projection operations of relational algebra with examples. [4M]

UNIT-III

6. a) Consider the following Schema:
EMP (Eno, Ename, Address, Salary, Supereno, Dno)
DEPT (Dno, Dname, Mgrssn)
Write the following queries in SQL [10M]
(i) Retrieve all employees in department 5 whose salary is between 30000 and 40000.
(ii) Display the names of employees and their corresponding supervisors.
(iii) Display the annual salary of the employees as annul_salary.
(iv) Display the names of the employees whose address consists of the string 'vij'.
(v) Display the information of employees in the ascending order of their names.
b) Explain natural join with example. [2M]

(OR)

7. a) Explain group by and having clauses with examples. [6M]
b) Explain outer join with examples. [6M]

UNIT-IV

8. a) Consider the following relation: R (X1, X2, X3, X4). The primary key of the relation is X1. The functional Dependencies hold: $X1 \rightarrow X2, X3$; $X2 \rightarrow X4$; Is the relation in 3NF? [6M]
b) Explain the properties of decomposition. [6M]

(OR)

- 9.a) What is two phase locking protocol? How can you say that two phase locking protocol result in deadlock? [8M]
b) Explain the properties of transaction. [4M]

UNIT-V

- 10.a) Differentiate primary and secondary indexing with examples. [8M]
b) Explain extendible hashing with examples [4M]

(OR)

- 11 a) Explain the structure of ISAM [8M]
b) Explain different access control methods offered by DBMS. [4M]