AR13

CODE: 13CE2004 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

FLUID MECHANICS
(Civil Engineering)

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

PART-A

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

1. a) How does the viscosity vary with temperature in liquids and gases. **1M**
   b) What do you understand by Hydrostatic law. **1M**
   c) Write the expression for centre of pressure of a vertical plane surface submerged in a static liquid. **1M**
   d) What forces act on a fluid element in static equilibrium? **1M**
   e) Differentiate uniform and non-uniform flows. **1M**
   f) Distinguish between a path line and a streak line. **1M**
   g) State any two applications of momentum principle. **1M**
   h) What is the relationship between the average velocity and maximum velocity in case of parallel flow between two fixed parallel plates? **1M**
   i) Define the term 'hydraulic gradient line'. **1M**
   j) What is Pitot tube? Write its two applications? **1M**

PART-B

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

UNIT-I

2. a) Define: atmospheric pressure, gauge pressure, vacuum pressure. 6M
   b) A simple U-tube manometer containing mercury is connected to a pipe in which an oil of specific gravity 0.8 is flowing. The pressure in the pipe is vacuum. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 200mm and height of oil in the left limb from the centre of the pipe is 150mm below. 6M

(OR)

3. a) What is vapour pressure? How does it vary with temperature? 6M
   b) Two horizontal plates are placed 1.25 cm apart, the space between them being filled with oil of viscosity 14 poises. Calculate the shear stress in oil if upper plate is moved with a velocity of 2.5 m/s? 6M

UNIT-II

4. a) Derive an equation for centre of pressure of an inclined plane surface submerges in a liquid. 6M
   b) A triangular plate of base width 2m and height 3m is immersed in water with its plane making an angle of 60^0 with the free surface of water. Determine the hydrostatic pressure force and the position of centre of pressure when the base of the plate is parallel to water surface and at a depth of 2.5m from water surface. 6M

(OR)

5. a) Explain the procedure of finding hydrostatic forces on curved surfaces. 6M
   b) Determine the total pressure and centre of pressure on an isosceles triangular plate of base 4 m and altitude 4 m when immersed vertically in an oil of specific gravity 0.9. The base of the plate coincides with the free surface of oil. 6M

UNIT-III

6. a) Derive the continuity equation from a stream tube (One dimensional flow). 6M
   b) Define velocity potential and stream function? The velocity components in a two dimensional flow field for an incompressible fluid are as follows: $u = \frac{y^3}{3} + 2x - x^2y$, $v = xy^2 - 2y - \frac{x^3}{3}$. Obtain an expression for stream function? 6M

(OR)

7. a) Classify various types of flows. 6M
   b) Explain the various methods of drawing flownets. 6M

UNIT-IV

8. a) State the momentum equation. Derive the expression for the force exerted by a flowing liquid on a pipe bend. 6M
   b) A 0.3m pipe carries water at a velocity of 24.4 m/s. At points A and B measurements of pressure and elevation were respectively 361kN/m^2 and 288kN/m^2 and 30.5 m and 33.5 m. For steady flow, find the loss of head between A and B. 6M

(OR)

9. a) Distinguish between laminar and turbulent flows. 6M
   b) Derive the expression for velocity distribution for viscous flow between parallel plates. 6M

UNIT-V

10. a) Explain in detail about pipes in series and pipes in parallel. 6M
    b) Derive the expression for discharge through a Broad crested weir. 6M

(OR)

11. a) Derive an expression for the discharge through an orifice meter. 6M
    b) What are the various minor losses in a pipe flow and also give their expressions? 6M

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AR13

CODE: 13EE2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

ELECTRICAL MACHINES-I
(Electrical & Electronics Engineering)

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

PART-A

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

1. a) Explain about co-energy. (1M)
   b) What are the materials used for brushes in DC machines**?** (1M)
   c) Which losses are called as constant losses in a DC Machine? (1M)
   d) Define Armature reaction in DC generators? (1M)
   e) Define Critical field resistance of a DC Shunt Generator? (1M)
   f) What is meant by equalizer connections? (1M)
   g) What is the advantage of DC motors over AC motors? (1M)
   h) What are different types of speed control methods? (1M)
   i) Draw the power flow diagram in Generating Mode (stray iron - loss is included in Pi and stray copper-loss in Pc)? (1M)
   j) List out Advantages of Hopkinson's Test? (1M)

PART-B

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

UNIT-I

2. (a) With neat diagrams explain about the constructional features of DC Machine? (7M)
   (b) Derive E.M.F Equation of a DC Generator? (5M)

(OR)

3. (a) With neat diagrams explain about DC Shunt, Series and Compound generators? (7M)
   (b) With neat diagrams explain about armature windings in a DC Machine? (5M)

UNIT-II

4. (a) With neat diagrams explain about Armature reactionin a DC generator? (7M)
   (b) Explain about Cross magnetizing and de- magnetizing AT/pole? (5M)

(OR)

5. (a) Explain about commutation Process in a DC generators? (7M)
   (b) Explain about different methods for improving commutation in DC generator? (5M)

UNIT-III

6. (a) With neat diagrams explain about Internal & External characteristics of DC Shunt, Series Generator? (7M)
   (b) Applications of DC Shunt, Series Generators? (5M)

(OR)

7. (a) Explain about the Necessity of Parallel Operation of DC Generators? (7M)
   (b) Explain about the conditions for Parallel Operation of DC Generators? (5M)

UNIT-IV

8. (a) With neat diagrams Explain the basic working Principle of DC Motor? (5M)
   (b) A 4-pole DC Motor is lap wound with 400 conductors. The pole shoe is 20c.m long and the average flux density over one pole pitch is 0.4T, the armature diameter being 30cm. Find the torque and gross mechanical power developed when the motor is drawing 25A and running at 1500 rpm. (7M)

(OR)

9. (a) With neat diagrams explain the characteristics of DC Shunt, Series and Compound motors? (7M)
   (b) With neat diagrams explain about Armature reaction in a DC Machine? (5M)

UNIT-V

10. (a) Limitations of Swinburne's test? (4M)
    (b) Explain about Separation of losses in a DC Machine? (8M)

(OR)

11. (a) The following test results were obtained while Hopkinson's test was performed on two similar dc shunt machines: (7M)
    Supply Voltage = 250V
    Field Current of Motor = 2A
    Field Current of Generator = 2.5A
    Armature Current of Generator = 60A
    Current taken by the two armatures from supply = 15A
    Resistance of each armature circuit = 0.2 Ω
    Calculate the efficiency of the motor and generator under these conditions of load.
    (b) Explain about Retardation Test? (5M)

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AR13

CODE: 13ME2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

PROUCTION TECHNOLOGY
(Mechanical Engineering)

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

PART-A

ANSWER ALL QUESTIONS [1 x 10 = 10 M]

1. a) What are the principal constituents of foundry sand?
   b) List any four casting defects.
   c) What is arc blow in welding?
   d) List any four welding defects.
   e) Name any three rolling stand arrangements.
   f) What is re crystallization temperature?
   g) What is spring back?
   h) What is punching?
   i) What is forming process?
   j) Define plastics.

PART-B

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

UNIT-I

2. (a) Explain the procedure to be adopted to reduce shrinkage defect. 4M
   (b) Explain the various elements of gating system. 8M

(OR)

3. (a) Describe the process of shell moulding and give its advantages. 6M
   (b) Draw a flow sheet of typical metal casting operation. 6M

UNIT-II

4. (a) Draw the sketch of four types of welding joints. 6M
   (b) Describe spray mode of metal transfer and its advantages over other mode of metal transfer. 6M

(OR)

5. (a) Explain the working principal of plasma arc welding. 8M
   (b) Differentiate between brazing and braze welding. 4M

UNIT-III

6. (a) Explain the main characteristics of hot working compared to cold working process. 6M
   (b) How does the grain size in a polycrystalline solid affect the strength of the solid? 6M

(OR)

7. (a) Describe the forces involved in hot rolling process. 6M
   (b) What is meant by break-down passes in rolling? Explain the principal break-down pass sequence. 6M

UNIT-IV

8. (a) Describe wire drawing method with net sketch. 6M
   (b) Differentiate between direct and indirect extrusion process. 6M

(OR)

9. (a) Discuss the general design consideration in forging. 6M
   (b) Discuss the method to manufacture seamless pipe. 6M

UNIT-V

10. (a) Explain about explosive forming with neat sketch. 6M
    (b) Write a short note on magnetic pulse forming. 6M

(OR)

11. (a) Differentiate between thermosetting plastics and thermoplastic plastics. 6M
    (b) Explain working principle of extrusion moulding process. 6M

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CODE: 13EE2007

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, January-2019

NETWORK ANALYSIS
(Electronics and Communication Engineering)

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

PART-A

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

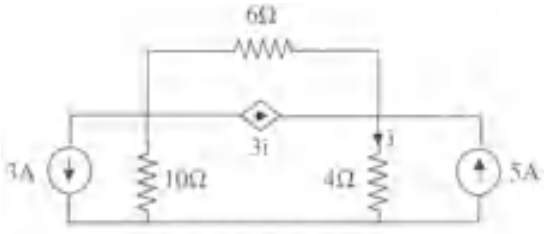
1.(a) Describe briefly the difference between an Ideal Source and practical Source.
(b) List out the Dependent Sources.
(c) Define tree and Co-tree of a graph.
(d) A coil has 20Ω resistor and 10mH Inductor. Find its Impedance
(e) Illustrate the resonance in series RLC Circuit
(f) Find the maximum possible mutual inductance of two coupled coils with self inductance L1=20mH, L2=100mH.
(g) If Z11 = 2Ω , Z12 = 4Ω, Z21 = 1Ω and Z22 = 3Ω, Find Y12 .
(h) State Norton's Theorem.
(i) Define band pass filter
(j) Define attenuation band.

PART-B

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

UNIT-I

2. a) What are network elements? Explain them 6M
b) Using nodal analysis techniques to determine current 'i' in the network shown in below figure. 6M



(OR)

3. a) Explain the source transformation techniques with suitable circuits. 6M
b) Derive the relation between star to delta transformation. 6M

UNIT-II

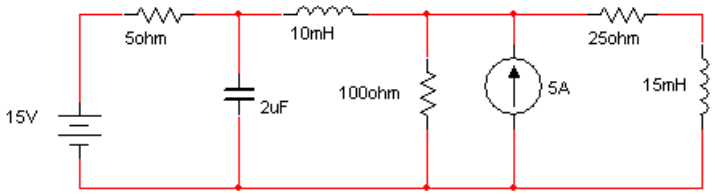
4. a) Define the following

i). Time period ii).Frequency iii). RMS value iv)Average value 6M

b) A series RLC circuit has a quality factor of 5 at 50 rad/sec. The current flowing Through the circuit at resonance is 10 A and the supply voltage is 100 V. The total Impedance of the circuit is 20 Ω. Find the circuit constants. 6M

(OR)

5. For the electrical network shown below, draw its connected graph and written its Incidence metrics and develop KCL and KVL equations. 12M



UNIT-III

6. a) Distinguish between magnetic circuits and electrical circuits. 4M

b) A series RLC circuit has the following parameters. R=15 Ω, L=2H, C=100 micro F. Calculate the resonant frequency. Under resonant condition, calculate current, power and Voltage drops across various elements, if the applied voltage is 100V. 8M

(OR)

7. a) Derive the expression for bandwidth of series RLC circuit. 6M

b) A series RLC circuit has a quality factor of 5 at 50 rad/sec. The current flowing Through the circuit at resonance is 10 A and the supply voltage is 100 V. The total Impedance of the circuit is 20 Ω. Find the circuit constants. 6M

UNIT-IV

8. In the circuit shown in Figure-8, find the current through R_L = 4 ohm connected across A-B terminals by utilizing Norton's theorem. 12M

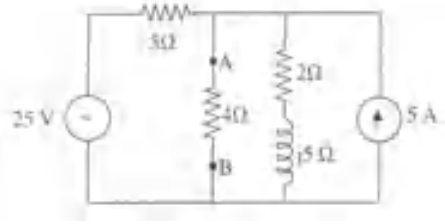


Figure-8

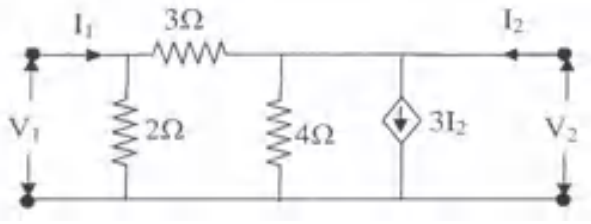


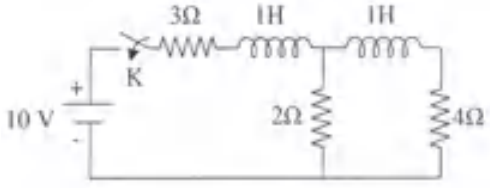
Figure-9

(OR)

9. Determine Y-parameters of the network shown in Figure-9 12M

UNIT-V

10. Using Laplace transformation technique, find current in each loop at $t=0^+$ following switching at t=0 of switch K is shown in below figure. Assume the network previously de-energized.



(OR)

11.a) Explain the concept of m-derived filters. 6M

b) Design a prototype band stop filter section having cut-off frequencies of 2000 Hz and 5000 Hz and design resistance of 600 Ω. 6M

AR13

CODE: 13CS2003 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, January-2019

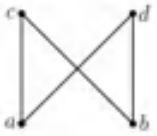
MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE
(Common to CSE & IT)

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

PART-A

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

1. a) Write the contra positive of the statement "If you work hard then you will get good GATE score."
   b) Define law of syllogism rule in inference theory.
   c) Find gcd(748,2024).
   d) Write the statement of Fermat's theorem.
   e) Write the adjacency matrix representation of the graph



   f) Write the Euler's formula for a planar graph.
   g) Define a group.
   h) Define Poset
   i) Find the coefficient of x^{10} in $(1 + x + x^2 + ...)^2$
   j) Solve $a_n = a_{n-1} + n$, $a_0 = 0$ by substitution method.

PART-B

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

UNIT-I

2. a) Verify whether the two statements $(p \vee q \to r)$ and $(\neg r \to \neg(p \vee q))$ are logically equivalent or not. **6M**
   b) Show that $\neg p$ follows logically from the premises $\neg(p \wedge \neg q), \neg q \vee r, \neg r$ **6M**

(OR)

3. a) Obtain disjunctive normal form of $p \to ((p \to q) \wedge \neg(\neg q \vee \neg p))$ **6M**
   b) Simplify the compound statement $(p \vee q) \wedge \neg(\neg p \wedge q)$ **6M**

UNIT-II

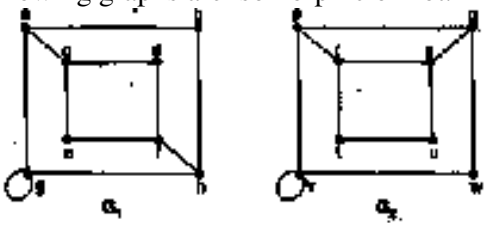
4. a) Find the remainder of (i) n = (1841)(1954) on division by 5 (ii) $n = 40^5$ on division by 19. **6M**
   b) Use mathematical induction prove that $n! > 2^n$ where $n \geq 4$ a positive integer. **6M**

(OR)

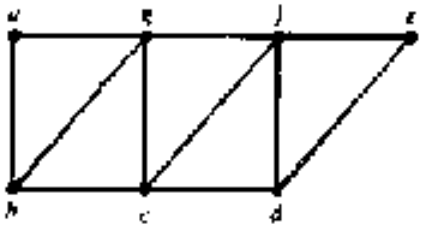
5. a) Using Fermat's theorem find 5^{1000} (mod 7). **6M**
   b) If n is positive integer using mathematical induction prove that $1^3 + 2^3 + 3^3 + ... + n^3 = n^2(n+1)^2/4$ **6M**

UNIT-III

6. a) Verify whether the following graphs are isomorphic or not. **6M**

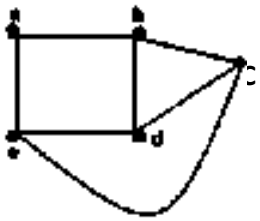


b) Verify whether the following graph has Euler trail or not. Justify. **6M**

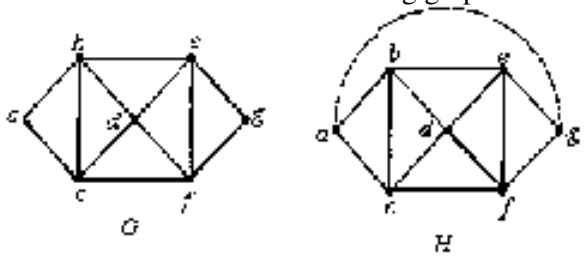


(OR)

7. a) Apply BFS algorithm to find a spanning tree to the following graph **6M**



b) Find the chromatic number for each of the following graphs G and H. **6M**



UNIT-IV

8. a) Consider the algebraic structure (Z,*), Z is the integer set and * is defined by a * b = a + b – ab . Verify whether (Z,*) is a group or not. **6M**

b) Prove that the set G = {0,1,2,3,4} forms a finite abelian group under addition modulo 5. **6M**

(OR)

9. Prove that (S, ≤) is a lattice, where S = {1,2,5,10} and ≤ is for divisibility. Prove that it is also a distributive lattice. **12 M**

UNIT-V

10. a) Solve the recurrence relation $a_{n+2} - 4a_{n+1} + 3a_n = -200$, $n \geq 0$, **6M**

b) Solve the recurrence relation $a_n = a_{n-1} + n^2$, $a_0 = 7$ by substitution method. **6M**

(OR)

11. a) Obtain the generating function for the sequence 1,1,1,0,1,1,1,1,1,..... **6M**

b) Solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$ for $n \geq 2$, given $a_0 = -3$, $a_1 = -10$ using generating function. **6M**

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