AR16

CODE: 16CE2003

SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, October, 2017

FLUID MECHANICS
(CIVIL ENGINEERING)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a. A flat plate weighing 0.45 KN has an area of 0.1 m^2. It slides down an inclined plane at 30^0 to the horizontal at a constant speed of 3 m/s. If the inclined plate is lubricated with an oil of viscosity 2 poises find the thickness of the film. **7M**

   b. Pipes A and B are carrying water at a pressures of 100 kN/m^2 and 200 kN/m^2 respectively. Pipe B is located 2 m above pipe A. Find the deflection of mercury in mercury U-tube differential manometer when both the limbs are connected to both the pipes. **7M**

(OR)

2. a. If the velocity distribution over a plate is given by $u = 2/3 y - y^2$ in which u is the velocity in meter per second at a distance y meter above the plate. Determine the shear stress at y=0.2 m. Take dynamic viscosity of fluid as 8.5 poises. **7M**

   b. Define and Derive Hydro static law. **7M**

UNIT-II

3. a. The lower corner of a tank has the shape of a quadrant of a circle of radius 1 m. The water surface is 2 m above the centre of the curvature. Considering the length of a tank as 3.5 m, calculate the magnitude and direction of resultant force acting on the curved surface. **7M**

   b. Write the conditions of equilibrium of floating and submerged bodies. **7M**

(OR)

4. a. Find the location and magnitude of hydrostatic force on an inclined circular plate of diameter 0.3 m of inclination of 30^0 with the water surface when the top of the plate is 2 m below the free water surface. **7M**

   b. Find the Meta centric height for a wooden block of width 2.5m and depth 1.5m, when it floats horizontally in water. The density of wooden block is 750 kg/m^3 and its length is 6.0m. **7M**

UNIT-III

5. a. The velocity vector in a fluid flow is given by $V = 2x^3i - 5x^2yj + 4tk$. Find the acceleration at (1,2,3) at time t=1 sec. **7M**

   b. Derive the continuity equation for a three dimensional flow. **7M**

(OR)

Page 1 of 2

6. a The velocity potential function is given by an expression $\phi = (-xy^3/3) - (x^2) + (x^3y/3) + (y^2)$ find the velocity components in x and y direction and show that ϕ represents a possible case of flow. **7M**

   b A pipe line through which water is flowing, is having diameters 25cm and 15cm at the cross sections 1 and 2 respectively. The velocity of water at section 1 is given 5 m/s. Find the velocity head at sections 1 and 2 and also rate of flow. **7M**

UNIT-IV

7. a What is Euler's equation of motion? How will you obtain Bernoulli's expression from it? **7M**

   b A 300 mm diameter pipe carries water under a head of 20 m with a velocity of 3.5 m/s. If the axis of the pipe turns through 45^0, find the magnitude and direction of resultant force at the bend. **7M**

(OR)

8. a A pipe line carrying oil of specific gravity 0.87, changes in diameter from 200mm diameter at a position A to 500mm diameter at position B which is 4m at a higher level. If the pressures at A and B are 9.81N/cm^2 and 5.886 N/cm^2 respectively and the discharge is 200litrs/sec. Determine the loss of head and direction of flow. **7M**

   b Explain in detail about Reynold's experiment. **7M**

UNIT-V

9. a Draw H.G.L and T.E.L for a horizontal pipe line 40 m long is connected to a water tank at one end and discharges freely into atmosphere at the other end. For the first 25 m of its length from the tank, the pipe is 150 mm diameter and its diameter is suddenly enlarged to 300 mm. The height of water level in the tank is 8 m above the centre of the pipe. Considering all losses of head which occur. Take coefficient of friction 0.01 for both sections of the pipe. **7M**

   b The head of water over an orifice of diameter 100 mm is 10 m. The water coming out from orifice is collected in a circular tank of diameter 1.5m. The rise of water level in this tank is 1.0m in 25 seconds. Also the coordinates of a point on the jet, measured from vena-contracta are 4.3 m horizontal and 0.5 m vertical. Find the coefficients C_d, C_v and C_c. **7M**

(OR)

10. a The difference in water levels in two tanks, which are connected by three pipes in series of lengths 300 m, 170 m, 210 m, and of diameters 300 mm, 200 mm, 400 mm respectively, is 12 m. Determine the rate of flow of water if coefficient of friction are 0.005, 0.0052 and 0.0048 respectively neglecting minor losses. **7M**

   b An orifice meter with orifice diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted u/s and d/s of the orifice meter gives reading of 19.62 N/cm^2 and 9.81 N/cm^2 respectively. Take C_d = 0.6. Find the discharge of water through the pipe. **7M**

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, October, 2017

ELECTRONIC DEVICES AND CIRCUITS

(Electrical and Electronics Engineering)

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

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1.	a	Derive the Diode Current Equation	7M
	b	Write the operation of Tunnel Diode with neat sketches	7M
		(OR)	
2.	a	Derive Average Current, Average Voltage, RMS Current and Efficiency for Half wave Rectifier	8M
	b	Derive the Capacitor filter for Half wave Rectifier	6M

UNIT-II

3.	a	Explain the Input and output characteristics of CB with neat Sketches	10M
	b	What is the relation between alpha, Beta and Gamma	4M
		(OR)	
4.	a	Explain the JFET operations with neat Sketches	7 M
	b	Explain the transfer and Drain characteristics of Enhancement mode MOSFET	7 M

UNIT-III

5.	a	What is the need for Biasing Explain	4 M
	b	Derive the fixed biased stability factor for Ico and Beta	10 M
		(OR)	
6.		Derive the collector to base stability factor for Ico, Beta and V_{BE}	14M

UNIT-IV

7.	a	Explain how to calculate CE h Parameters from the input and output characteristics	8M
	b	List the advantages of using H parameters	6M
		(OR)	
8.	a	Derive the CE amplifier Current gain and voltage gain using H parameter	10M
	b	Define the various h parameter and give their units	4M

UNIT-V

9.	a	Draw the classification of feedback amplifiers	8M
	b	Compare the Negative and positive feedback	6M
		(OR)	
10.	a	Derive the expression for RC phase shift oscillator	7M
	b	Derive the expression for Colpitts oscillator	7M

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AR16

CODE: 16ME2006   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, October, 2017
PRODUCTION TECHNOLOGY
(MECHANICAL ENGINEERING)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1.	a	Describe the types of molding sands and their properties	6M
	b	Explain the shell molding process. Write merits and demerits of the process	8M
		(OR)	
2.	a	Describe the various elements of gating system	7M
	b	List different types of casting defects and their remedies	7M

UNIT-II

3.	a	Explain the principle of Oxy-acetylene cutting process	7M
	b	Explain the principle of MIG welding process and its applications	7M
		(OR)	
4.	a	Explain the principle of Laser beam welding process	6M
	b	List various defects in welding process and their remedies	8M

UNIT-III

5.	a	Describe hot working and cold working processes	6M
	b	Explain rolling stand arrangements	8M
		(OR)	
6.	a	Explain Forward and impact extrusion processes	7M
	b	Explain the principle of tubedrawing process	7M

UNIT-IV

7.	a	Define forging. Explain the smith forging operation and its applications	7M
	b	Describe the drawing in forging and its applications	7M
		(OR)	
8.	a	Describe blanking and bending operqtions	7M
	b	Describe Embossing and coining operations	7M

UNIT-V

9.	a	Explain Magnetic pulse forming process and its applications	7M
	b	Describe Electo hydraulic forming process and its applications	7M
		(OR)	
10.	a	Explain the principle of injection molding and its applications	7M
	b	Describe the principle of blow molding	7M

AR16

CODE: 16EC2004   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, October, 2017

PULSE AND DIGITAL CIRCUITS
(Electronics and Communication Engineering)

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

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a. Prove that a low pass circuit acts as an integrator. Derive an expression for the output voltage levels under steady state conditions of a low pass circuit excited by a ramp input.   7M

   b. A 100 Hz triangular wave with peak to peak amplitude of 9V is applied to a differentiating Circuit with R=1MΩ & C= 100PF . Calculate & sketch the waveform of the output   7M

(OR)

2. a. Draw the response of an RC high pass circuit when applied with exponential input. Explain the response for different time constants.   7M

   b. Derive an expression for output of a low pass RC circuit excited by a ramp input.   7M

UNIT-II

3. a. Explain the working of a two-level diode clipper with the help of circuit diagram, waveform and transfer characteristics.   7M

   b. For the diode clipping circuit assume that V_R= 10V , V_i=20 SinWt and that the diode forward resistance is R_f=100Ω while R_γ=α, and V_γ=0. Neglect all capacitances. Draw to scale the input & output waveform & lable the maximum & minimum values of (a) R=100 Ω (b) R=1K Ω (c) R= 10K Ω (d) Repeat the above with R_r=10K Ω.   7M
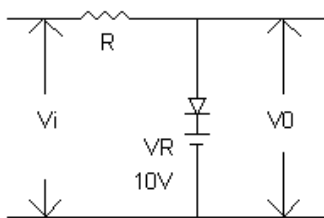
(OR)

4. a. Give the Practical analysis of diode clamping circuit and explain the transient & steady state response to a square wave input.   8M
   b. Give some applications of clipping & Clamping circuits.   6M

UNIT-III

5. a. With the help of circuit diagram explain the working of fixed bias Binary.   7M
   b. Explain how semiconductor diode can be used as a switch in a digital circuit.   7M

(OR)

6. a. Explain where the load is connected to the binary and why? Represent it with the 8M
   help of necessary expressions.
   b. Explain the diode switching times: Storage time, Transition time and Reverse 7M
   recovery time.

UNIT-IV

7. a. Explain the operation of monostable multivibrator and draw the voltage levels in 7M
   stable and quasi stable state.
   b. Explain the operation of a transistor Bootstrap sweep circuit. 7M
   (OR)
8. a. Design an astable multivibrator to produce ansymmetrical square wave of duty 7M
   cycle 70%, amplitude 15V.Assume $h_{FE(min)}$=20, $I_{C(sat)}$=5mA and $V_{CE(sat)}$=0.
   b. Explain the basic principles of Miller and bootstrap time base generators. 7M

UNIT-V

9. a. Explain the working of monostable Blocking oscillator with base timing. 8M
   b. Why are sampling gates called linear gates? 6M
   (OR)
10. a. What are the relative advantages of diode controlled and RC controlled astable 8M
    blocking oscillator.
    b. Compare unidirectional and bidirectional sampling gates. 6M

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AR16

CODE: 16CS2003   **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Regular Examinations, October, 2017

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(Computer Science and Engineering)

Time: 3 Hours   Max Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the Question must be answered at one place

UNIT-I

1. a) Show that: $P \vee (\sim P \wedge Q) \Leftrightarrow (P \vee Q)$
    b) Show that $S \vee R$ is tautologicaly implied by $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow S)$.

(OR)

2. a) Convert the following English statements to predicate logic notation:
        i)   All Mokeys have tails. ii) No Mokey has a tail.
        ii)   Some Monkeys have tails.
   b) Prove by Using Mathematical Induction, $(x-y)$ divides $(x^n - y^n)$, $\forall$ n≥1.

UNIT-II

3. a) If A={1,2,3,5,30} an R is divisibility relation, prove that (A,R) is lattice but not distributive
    b) Let X={1,2,3,6,12,18 } and the relation | is x divides y. Draw the Hasse diagram of (X, |).
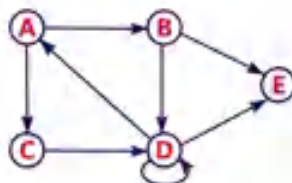
(OR)

4. a) Show that the function $f(x)=x^2$ is not bijective function. Can we find its inverse?.
    b) State Pigeon Hole Principle.Show that sum or difference of two integers in any given seven integers is divisible by 10.
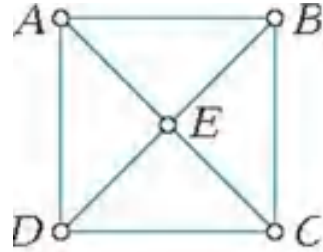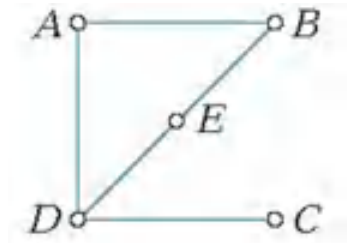
UNIT-III

5. a) Check whether the following two graphs G,H are isomorphic
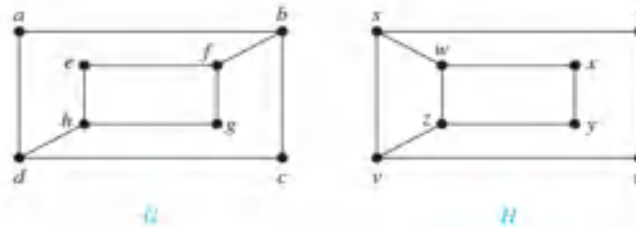
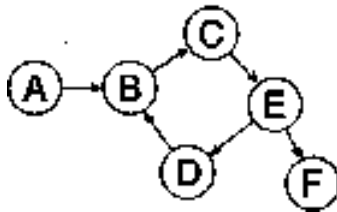   b) Define a Graph.Give the incidence and adjacency matrix of the given graph.

(OR)

6. a) State and Prove Euler formula on Planar graphs.
   b) Check Whether following Graphs has Euler path and circuits

7. a) Find the Breadth First Search of the graph.

   b) Find the Minimal Spanning tree using Krushkal's Algorithm.
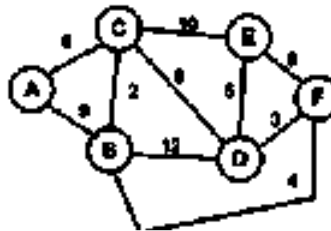
(OR)

8. a) Write algorithm to find Depth First Search of the graph. Illustrate with an example
   b) Find the Minimal Spanning tree using Prims's Algorithm.
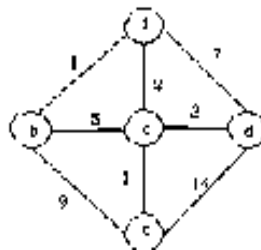
UNIT-V
9. a) Find the coefficient of X^{23} in $(1+X^5 +X^9)^{10}$

   b) Compute the coefficients of $\sum d_r X^r = \dfrac{x^5}{x^2-5X+6}$

(OR)

10. a) Solve the Recurrence Relation $F_n = F_{n-1} + F_{n-2}$,$n \geq 2$ and $F_0 = F_1 = 1$.

    b) Solve the Recurrence Relation $a_n - 6a_{n-1} + 8a_{n-2} = n.4^n$.

2 of 2
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AR13

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

FLUID MECHANICS
(Civil Engineering)

Time: 3 Hours   Max Marks: 70

PART-A
ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) Define surface tension and state its units.
   b) What is a streak line?
   c) State Pascal's Law.
   d) Differentiate between steady and unsteady flow.
   e) Explain the term Total pressure.
   f) State the principle of conservation of momentum.
   g) What are major and minor losses?
   h) What is meant by stagnation pressure?
   i) What is meant by a Notch? How are Notches classified?
   j) What is meant by siphon?

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

UNIT-I
2. a Obtain the expression for Bulk modulus of elasticity (K) of a fluid in terms of   6
      pressure (p) and mass density (ρ).
   b Explain how vacuum pressure can be measured with the help of U-Tube   6
      manometer.

(OR)

3. a The dynamic viscosity of oil is used for lubrication between shaft and sleeve   6
      is 6 poise. The shaft is of 0.4m diameter and rotates at 190rpm. Calculate the
      power lost in the bearing for a sleeve length of 90mm. The thickness of oil
      film is 1.5mm.
   b Distinguish between manometers and mechanical gauges. What are the   6
      different types of mechanical gauges?

UNIT-II
4. a Determine the total pressure and depth of centre of pressure on a plane   6
      rectangular surface of 1m wide and 3m deep when its upper edge is
      horizontal and (i) coincides with water surface (ii) 2m below the free water
      surface.
   b A pipe line which is 4m in diameter contains a gate valve. The pressure at the 6
      centre of the pipe is 19.6 N/cm^2. If the pipe is filled with oil of specific
      gravity 0.87. Find the force exerted by the oil upon the gate and position of
      centre of pressure.

(OR)

5. a Show that the centre of pressure of any lamina immersed under liquid is always below its centroid. 6

   b Determine the total pressure on a circular plate of diameter 1.5m which is placed vertically in water in such a way that centre of plate is 2m below the free surface of water. Find the position of centre of pressure also. 6

UNIT-III

6. a Define and explain the terms (i) velocity potential function (ii) Stream function. 4

   b Calculate the unknown velocity components so that they satisfy the continuity equation (i) $u = 2x^2$; $v = xyz$; $w =?$ (ii) $u = (2x^2 + 2xy)$; $w = (z^3 - 4xz -2yz)$; $v =?$ 8

(OR)

7. a Define the equation of continuity and obtain its expression for three dimensional flow. 6

   b The stream function for two-dimensional flow is given by $\Psi = 8xy$, Calculate the velocity at the point P (4, 5). Find the velocity potential function($\emptyset$) 6

UNIT-IV

8. a What are the different energies of fluids? Explain each of them. 4
   b Derive Bernoulli's equation from Euler's equation of motion. 8

(OR)

9. a State momentum equation. How will you apply the momentum equation for determining the force exerted by a flowing liquid on a pipe bend. 6

   b Water is flowing through a pipe having diameter 300mm and 200mm at the bottom and upper end respectively. The intensity of pressure at bottom end is 24.5N/cm^2 and upper end is 9.8N/cm^2. Determine the difference in datum heads if rate of flow is 40 lt/sec. 6

UNIT-V

10. a What is a compound pipe? What will be the loss of head when pipes are connected in series? 4

    b Find the discharge through a trapezoidal Notch which is 1m wide at the top, 0.4m at bottom and is 30cm in height. The head of water on notch is 20cm. Assume C_d for rectangular portion is 0.62 and for triangular portion is 0.6 8

(OR)

11. a What do you mean by equivalent pipe? Obtain the expression for equivalent pipe. 4

    b An oil of specific gravity 0.8 is flowing through a venturimeter having inlet diameter 20cm and throat diameter 10cm. The oil-mercury differential manometer shows a reading of 25cm. Calculate the discharge of oil. Take $C_d = 0.98$ 8

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Code: 13EC2007

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.TECH I SEM SUPPLEMENTARY. EXAMINATIONS, OCTOBER, 2017

ELECTRONIC DEVICES AND CIRCUITS
(Electrical & Electronics Engineering)

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

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

PART - A

1.   (a) Define mass action law
      (b) What are the applications of SCR?
      (c) What is zener breakdown mechanism?
      (d) Define early effect?
      (e) What are the advantages of FET?
      (f) Define peak inverse voltage of a diode.
      (g) What happened for improper biasing in an transistor?
      (h) What is meant by depletion region?
      (i) What are the applications of Photo diode?
      (j) Define pinch-off region in the case of JFET?

PART – B

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

UNIT-I

2) a) Differentiate between intrinsic semiconductor and extrinsic semiconductor in detail
   and give examples?   [6M]
  b) Explain P-N junction diode in forward biasing and reverse biasing conditions with
   circuits and also explain its V-I characteristic?   [6M]

(OR)

3) a) What is Fermi level? Derive expression for Fermi level and sketch the position in
   case of intrinsic, P-type and N-type semiconductors.   [6M]
  b) Explain Hall Effect and derive an expression for Hall coefficient and also mention its
   applications.   [6M]

UNIT-II

4) a) Draw and explain working principle of LED and also its V-I characteristics   [6M]
  b) Explain working principle of tunnel diode with the help of energy band diagrams?
                                                          [6M]

Code: 13EC2007

<center>(OR)</center>

5) a) Write short notes on
   (i) Varactor Diode
   (ii) Zener Diode   [6M]
   b) Explain the operation of Half wave rectifier with circuit and waveforms?   [6M]

UNIT-III

6) a) Draw the circuit diagram of BJT in CC configuration and explain with the help of
        input and output characteristics   [6M]
    b) Define and explain the three parameters of JFET and give relations between them [6M]

<center>(OR)</center>

7) a) Draw and Explain the circuit diagram of Common Base transistor with the help of
       input and output characteristics ?   [6M]
    b) Draw and Explain the circuit diagram of CE transistor with the help of input and
       output characteristics   [6M]

UNIT- IV

8) a) Draw the circuit diagram of collector to base bias and derive the expression for S? [6M]
    b) Draw the small signal model of conventional common emitter amplifier and determine
       the expression for voltage gain and input impedance?   [6M]

<center>(OR)</center>

9) a) Explain about Bias compensation techniques with circuit diagrams?   [6M]
    b) What is thermal runway? How to avoid it in amplifier circuit using BJT?   [6M]

UNIT- V

10) a) Describe with necessary derivations, the effect of negative feedback on the bandwidth
        and distortion of amplifier?   [6M]
     b) Explain the working of Hartley oscillator?   [6M]

<center>(OR)</center>

11) a) Explain the condition of oscillations of Wien bridge oscillator?   [6M]
     b) Explain the working of collipts oscillator?   [6M]

<center>2 of 2</center>

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AR13

CODE: 13ME2005

SET-1

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

PROUCTION TECHNOLOGY
(Mechanical Engineering)

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

PART-A

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

1. a) What is meant by loam sand?
    b) What are the types of furnace in casting process?
    c) Is submerged arc welding applicable for roof welding? Justify.
    d) Define projection welding process?
    e) Define recrystallization temperature?
    f) Why forming process is suitable for mass production? Justify.
    g) What are the various types of extrusion process?
    h) What is basics difference between spinning and coning process?
    i) What are the types of high velocity forming processes?
    j) What is function of filler material in plastic processing?

PART-B

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

2. a) Explain the allowances and types of allowances in casting process with neat diagram?   8M

   b) Describe the shell moulding process to fabricate a given product with neat diagram?   4M

(OR)

3. a) Explain the step by step procedure to design the raiser for casting a given product?   6M

   b) Describe the construction and working principle of cupola furnace with neat diagram?   6M

UNIT-II

4. a) Explain the various types of inert gas welding process with neat diagram?   8M

   b) Explain various types of flames and its applications in oxy-acetylene gas welding process?   4M

(OR)

5. a) Describe about spot and seam welding process with neat diagram and also discuss about heat generation in this process?   8M

   b) Suggest a suitable process to weld two cylindrical rods by heat produced by mechanical means without adding any filler material and explain in detail with neat sketch?   4M

UNIT-III

6. a) Explain the cold working and hot working process in detail with neat diagram? 8M
   b) Explain major advantages of forming process compared to other manufacturing processes? 4M

(OR)

7. a) Explain in detail about analysis of rolling process with neat diagram? 6M
   b) Describe the various types of rolling passes with neat diagram? 6M

UNIT-IV

8. a) Suggest a suitable process to fabricate 1 mm diameter wire from 10 mm diameter rod and explain the process with step by step procedure? 8M
   b) Explain the Impact extrusion process with neat diagram? 4M

(OR)

9. a) Explain about the press forging and upset forging process in detail with diagram 6M
   b) Explain the following process such as punching, blanking, spinning, and coining with neat diagram? 6M

UNIT-V

10. a) Explain in detail about magnetic pulse forming with neat diagram and discuss its process parameters? 8M
    b) Compare the explosive forming and electro hydraulic forming process? 4M

(OR)

11. a) Explain about calendaring and blow moulding process in detail with neat diagram? 6M
    b) Explain the processes to fabricate various types of plastics with neat diagram? 6M

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.TECH I SEM SUPPLEMENTARY EXAMINATIONS, OCTOBER, 2017

NETWORK ANALYSIS
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1.   Define the following
   a) Electric charge
   b) Ohm's law
   c) RMS value
   d) Peak factor
   e) Cut set
   f) Time constant
   g) Dot rule of coupled circuits
   h) Reciprocity theorem definition
   i) Hybrid parameter
   j) Selectivity

PART-B

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

UNIT-I

2.   a)   Define different types of circuit elements. Define ideal and non-ideal [6 M]
          sources, dependent and independent sources.
     b)   In the given circuit,   [6 M]
          i. Find the power associated with the 6 V source.
          ii. State whether the 6 V source is absorbing or delivering power.
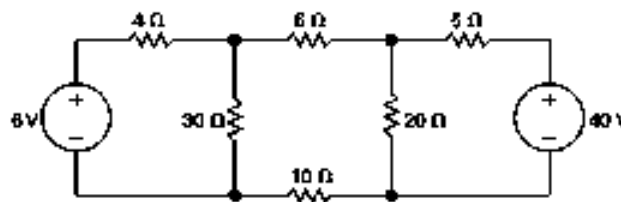

(OR)

3.   a)   What is current division and voltage division rules explain with examples   [6 M]
   b)   Applying Kirchoff's law and ohm's law calculate v_o in the given circuit.   [6 M]
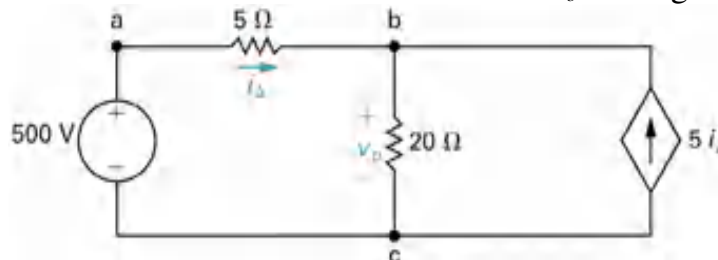
UNIT-II

4. a) Define amplitude, time period, frequency, peak factor and form factor [4 M]
   of a sinusoidal signals.
   b) Find *rms* and average value of the triangular current waveform given [8 M]
   below. Assume peak value of current I_m.
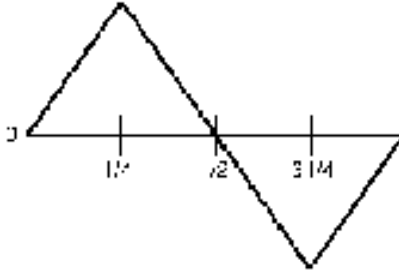
(OR)

5. a) Define the terms, graph, oriented graph, tree, co-tree, sub-graph and [4 M]
   connected graph.
   b) Find the incidence matrix and reduced incidence matrix of the circuit [8 M]
   given below:
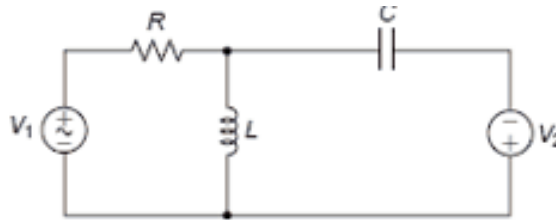
UNIT-III

6. a) State and explain the condition of resonance in a series RLC ac circuit. [4 M]
   b) Derive the expression of resonant frequency, half power frequency, [8 M]
   selectivity, bandwidth and quality factor of a series RLC ac circuit.
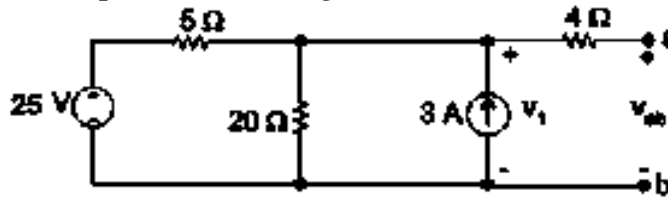
(OR)

7. a) Derive the V-I relationship of a series R, C circuit excited by ac [4 M]
   sinusoidal source.
   b) Calculate the value of current both in time domain and phasor form of [8 M]
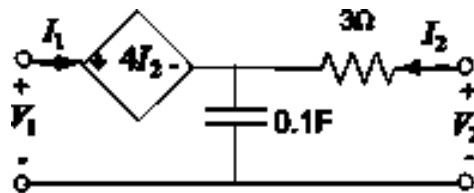   the given circuit.
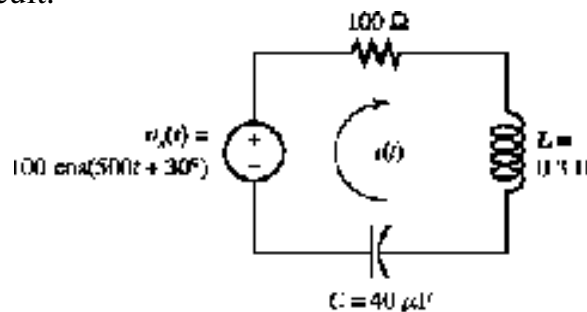
UNIT-IV

8. a) State and explain Thevnin's theorem.   [4 M]
    b) Find the Norton equivalent of the given circuit from ab terminal point: [8 M]
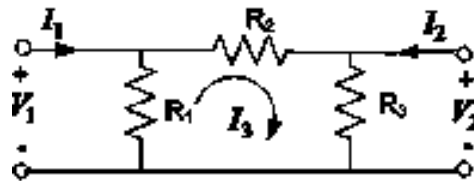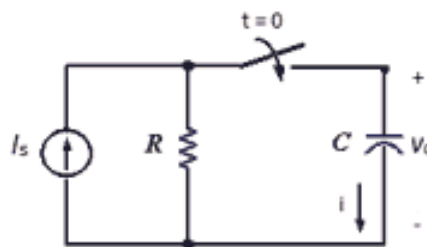

(OR)

9. a) Determine the impedance parameter of the given circuit   [6 M]

    b) Determine the admittance parameter of the given circuit   [6 M]

UNIT-V

10.   The switch is closed at t=0, then derive the expression of capacitor [12 M]
          voltage for the given circuit.

(OR)

11.   Design a K-type low pass filter (T-section and π section with cutoff [12 M]
          frequency 4000 Hz, with nominal impedance of 700Ω.

AR13

Code: 13CS2003   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANANGEMENT, TEKKALI
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, October, 2017

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

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

PART-A

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

1   (a) What is indirect proof of implication.
       (b) Construct the truth table of $\sim(\sim(\sim(p\wedge q)))$
       (c) If lcm (a,b) = c , then gcd (a,b) is what?
       (d) What is the value of $1^2+2^2+3^2+.....n^2$
       (e) Write Eulers formula for plane graph.
       (f) what is the number of edges of complete graph k_n
       (g) What is tree?
       (h) What is poset ?
       (i) Write general form of 2nd order linear homogeneous recurrence relation.
       (j) Define semi group with example.

PART – B

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

UNIT – I

2   (a) obtain PCNF of $(p\wedge q)\vee(\sim p\wedge q\wedge r)$

       (b) Determine whether the following inference pattern is valid or invalid
                     $p\to(r\to s)$
                     $\sim r\to\ \sim p$
                     p
                     ------------------------   [6M+6M]
                         $\therefore\ S$
                                    (OR)
3   (a) Write the negation of the following sentence by changing quantifier "Every
           complete bipartite graph is not planar".
       (b) Symbolic the following argument and check for its validity "Lions are dangerous
           animals " "There are Lions ".Therefore there are dangerous animals.   [6M+6M]

UNIT – II

4   (a) Find the integers x and y such that 37x + 249y = 1
        (b) Prove by mathematical Induction that $p(n) = \sum_{n=1}^{n}`\frac{1}{(2n-1)(2n+1)} = \frac{n}{2n+1}$

                                                                          [6M+6M]
                                    (OR)
5   (a) If a and b are two positive integers,then gcd (a,b) x lcm (a,b) = ab
       (b) Prove by the principle of mathematical induction that
               $P(n) = 10^n + 3.4^{n+2} + 5$ is divisible by 9   [6M+6M]

AR13

UNIT -III

6.   If G is a nontrivial tree then G contains at least 2 vertices of degree 1   [12M]

(OR)

7.   Prove that the complete graph k_5 is not planar.   [12M]

UNIT –IV

8   (a) Prove that the set G = {0,1,2,3,4,5} is a finite abelian group under ordinary addition modulo 6 as the operation.
        (b) Let I be the set of positive integers and * be an operation an S = I x I defined by
        (i) (a,b) * (c,d) = (ac,bd)   (ii) (a,b) * (c,d) = (a+c, b+d) show that S is a semigroup.   [6M+6M]

(OR)

9.   Define lattice poset explain with example. What is distributive lattice. Prove that if a and b are elements in bounded distributive lattice and if a has a complement a′ then a∨ (a′ ∧ b) = a ∨ b and a∧ (a′ ∨ b) = a ∧ b   [12M]

UNIT-V

10.   Solve the recurrence relation $a_n - 6a_{n-1} + 8 a_{n-2} = 0$ for n≥2.   [12M]

(OR)

11.   Solve the recurrence relation $a_n - 9a_{n-1} + 26 a_{n-2} - 24 a_{n-3} = 0$ for n≥3.   [12M]

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