AR16

CODE: 16CE2005   **SET-2**

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

ENVIRONMENTAL ENGINEERING-I
(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 Write the desirable limits as per IS 10500 -2012 and their effects when they exceed their limits.   8M
   (i) Hardness, (ii) Nitrates, (iii) Fluorides and (iv) Alkalinity
   b Write short notes on   6M
        i) Fire demand and ii) Hourly fluctuations in demand
   (OR)
2. a Describe the objectives of protected water supply scheme   6M

   b Write various types of Physical and Chemical impurities and their effects   8M

UNIT-II

3. a What is the function of intake structure ? Draw a neat sketch of river intake.   6M

   b Describe the functions of Gate valve & Non- return valve with the help of neat sketches   8M

   (OR)
4. a Describe the procedure to estimate the capacity of balancing reservoir.   7M
   b Explain about the Hardy Cross method of analysis of distribution system.   7M

UNIT-III

5. a Draw the flow diagrams of water treatment for the following.   6M
        i) River water subjected to pollution from drainage waste of city
        ii) Ground water free from pollution but containing Hardness and dissolved gases
   b Explain how fine impurities are removed from water in the Coagulation process. Discuss about two commonly used coagulants.   8M

   (OR)
6. a Write the principle of coagulation. List various types of coagulants used for water treatment. Describe about any one coagulant   8M

   b Find the quantity of Alum at rate of 15 mg/l to treat 10 MLD of water. Also find the amount of CO_2 released per litre of treated water. (Molecular weights: Al-27, S- 32, Ca-40, C-12)   6M

CODE: 16CE2005   **SET-2**

UNIT-IV

7. a   Describe Mechanisms of filtration   6M

   b   Explain briefly about slow sand filter with the help of neat sketch.   8M
                                   (OR)
8. a   With help of a sketch explain the functioning of a Rapid sand filter including the   8M
       back washing
   b   What are the different methods of chlorination and Explain Break point   6M
       Chlorination

UNIT-V

9.   Describe composition, collection and transportation of MSW   14M
                                   (OR)
10   Describe Composting and Sanitary land fill methods of disposal of solid wastes.   14M

AR 16

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

FLUID MECHANICS AND HYDRAULIC MACHINERY
(Common to EEE & MECH)

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 any five significant properties of fluids.   (7)

    (b)   A flat plate weighing 0.45 kN has a surface area 0.1 m^2. It slides down an
          inclined place at 30^0 to the horizontal, at a constant speed of 3 m/sec. If the
          inclined plane is lubricated with an oil of viscosity 0.1 N-S/m^2, find the
          thickness of the oil film.   (7)

                                            (OR)

2. (a)   Derive the continuity equation in three dimensions for steady incompressible
          fluid flow.   (7)

    (b)   Define stream function and velocity potential. Show that following stream
          function $\psi = 6x - 4y + 7xy + 9$ represents an irrotational flow.   (7)

UNIT - II

3   (a)   Define the Bernoulli's theorem and derive Bernoulli's equation by mentioning
          the assumptions made.   (7)

    (b)   A 45^0 reducing bend is connected in a pipe line, the diameters at the inlet and
          outlet of the bend being 600 mm and 300 mm respectively, find the force
          exerted by water on the bend if the intensity of pressure at inlet to bend is 8.829
          N/cm^2 and rate of flow of water is 600 liters/sec.   (7)

                                            (OR)

4   (a)   Explain the principle of Venturimeter with neat sketch. Derive an equation for
          the rate of flow through it.   (8)

    (b)   A horizontal Venturimeter with an inlet diameter 20 cm and the throat diameter
          10 cm is used to measure the flow rate of water. The pressure at the inlet is 15
          N/cm^2 and the negative pressure at the throat is 40 cm of mercury. Find the rate
          of flow through the meter. Take $C_d = 0.98$.   (6)

UNIT - III

5   (a)   Derive an expression for loss of energy due to friction in a pipe flow.   (6)

    (b)   A horizontal pipe line 40m long is connected to a water tank at one end & discharges freely into the atmosphere at the other end. For the first 25m of its length from the tank, the pipe is 15cm dia., and its dia. is suddenly enlarged to 30cm. The height of water in the tank is 8m above the centre of the pipe. Considering all losses of head which occur, determine the rate of flow. Take f = 0.04 for both the section of the pipe.   (8)

(OR)

6   (a)   Derive an expression for the force exerted by the jet on an inclined moving plate.   (6)

    (b)   A jet of water having a diameter of 65 mm and the head of water at the center of the nozzle is 100 meters strikes a flat plate, the normal of which is inclined at 55^0 to the axis of the jet.   Find the normal force on the plate, when (i) the plate is stationary, (ii) the plate is moving with a velocity of 16 m/sec in the direction of the jet. Also determine the power and efficiency of the jet, when the plate is moving. Take C_v as 0.96.   (8)

UNIT - IV

7   (a)   Discuss the classification of turbines with examples.   (8)

    (b)   A double jet Pelton turbine has a specific speed of 14 and is required to deliver 1000 kW. The water is supplied through a pipeline from a reservoir whose level is 400 m above the nozzle. Assume 5 % H for friction loss in the pipe, calculate, i) Speed in r.p.m., ii) Diameter of jet and iii) Mean diameter of bucket circle. Take Cv = 0.98; φ = 0.46; η_o = 85%   (6)
.

(OR)

8   (a)   Define Specific Speed and Derive an expression for specific speed of a turbine.
                                                                                                                        (7)

    (b)   What are unit quantities? Define the unit quantities for a turbine.   (7)

UNIT - V

9   (a)   Explain the principle and working of a Centrifugal Pump with a neat sketch.   (7)

    (b)   With a neat sketch explain the working of a Reciprocating Pump.   (7)

(OR)

10   A three stage Centrifugal pump has impellers 40 cm in diameter and 2 cm wide at outlet.   The vanes are curved back at the outlet at 45^0 and reduce the circumferential area by 10%.   The Manometric efficiency is 90% and the Overall efficiency is 80%, determine the head generated by the pump, when running at 1000 r.p.m., delivering 50 lt/sec. What should be the S.H.P.?..   (14)

AR16

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
LINEAR CONTROL SYSTEMS
(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 What are the advantages and disadvantages of closed loop control system   6M

    b Obtain the transfer function between X(s) and F(s) of Fig.1.   8M
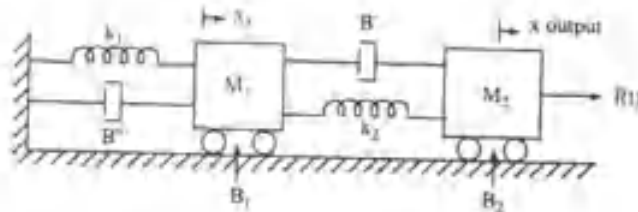
Fig.1

(OR)

2. a Explain the following terms related to signal flow graph: 6M
       i.   Node   ii. Branch   iii. Loop gain

    b Find the closed loop transfer function of the system whose block diagram is given 8M
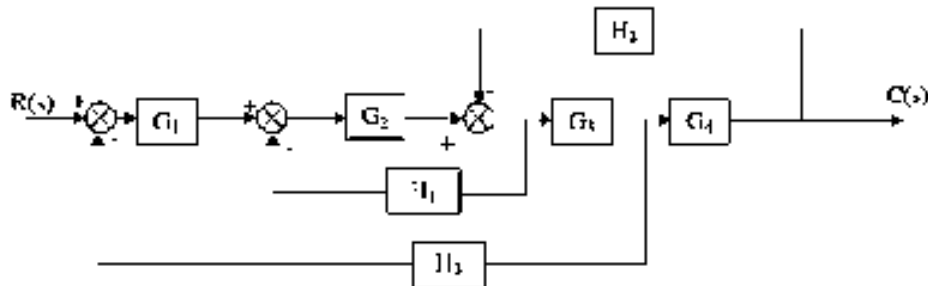   in Fig. 2

Fig.2

UNIT-II

3. a Derive the transfer function and develop the block diagram of Armature controlled 6M
       DC servo motor.

    b A feedback system is described as, $G(s) = \dfrac{50}{s(s+2)(s+5)}$; H(s) = 1/s ; for an   8M

       input of $1+4t+\dfrac{3t^2}{2}$, determine the steady state error constants and errors.

(OR)

4. a Derive the transfer function of an AC Servo motor.   6M
    b Derive an expression for the maxim peak overshoot, rise time and settling time of a 8M
       typical 2nd order system time response.

1 of 2

5. a   A system is having characteristic polynomial equation: 6M

$$2s^4 + 4s^2 + 1 = 0$$

By using RH stability criterion, Find
(i) the number of roots in the left half of s-plane
(ii) the number of roots in the right half of s-plane
(iii) the number of roots on imaginary axis.

  b   For a unity feedback open loop transfer function   8M

$$G(s) = \frac{K}{s(s^2 + 3s + 10)}$$

Draw a rough sketch of root locus plot by determining
(i) centroid;   (ii) number and angle of asymptotes
(iii) points of interaction with $j\omega$ axis.

(OR)

6.   Sketch the root locus plot of an open loop transfer function   14M

$$G(s)H(s) = \frac{K}{s(s+1)(s+5)}$$

Determine the range of 'K' for the system to have damped oscillations and also determine the value of 'K' so that the dominant pair of complex poles of the system has a damping ratio of 0.6.

7. a   Derive the expressions for frequency domain specifications of a second   order   6M
system.

  b   Given the open loop transfer function of a unity feedback system,   8M

$G(s) = \frac{1}{s(3+s)(1+2s)}$. Draw the Bode magnitude plot and measure from the plot the

frequency at which the magnitude is 0 dB.

(OR)

8.   A unity feed-back control system has G(s) = $\frac{10}{s(s+1)(s+2)}$ Draw the Nyquist plot   14M

and comment on closed loop stability?

9. a   What is a lag compensator? Obtain the transfer function of lag compensator   8M
    and draw pole-zero plot.

  b   Evaluate the controllability and observability of a system with the   matrices?   6M

$$A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}, B = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, C = \begin{bmatrix} 1 & 1 \end{bmatrix}$$

(OR)

10. a   Write the properties of state transition matrix.   6M
   b   Write the state equation of the system show in fig.3, in which $X_1, X_2 \& X_3$ 8M
      constitutes the state vector.
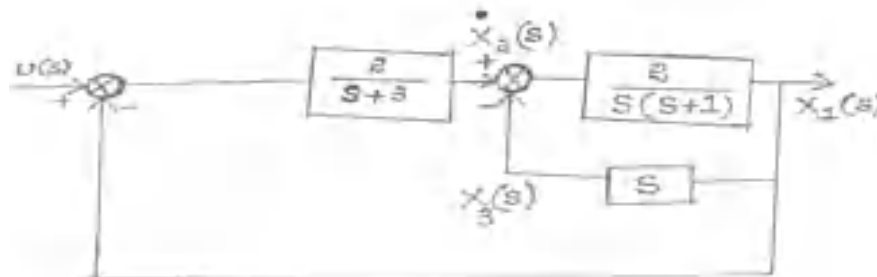

Fig.3

AR16

CODE: 16CS2004   **SET-1**

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

OBJECT ORIENTED PROGRAMMING
(Common to CSE & IT)

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	Explain about basic data types in C++	7M
	b	Explain about writing functions in C++	7M
		(OR)	
2.		Explain about concepts of Object Oriented Programming	14M

UNIT-II

3.	a	What are classes? Create a class "Student" with the following data members: name, roll_no, marks_percentage, contact_number. Define 2 member functions read_Data() and print_Data() whose task is to read details of student and display the details of the student.	7M
	b	Explain about destructors with an example program	7M
		(OR)	
4.	a	Explain about Binary operator overloading with an example program	7M
	b	Explain about copy constructor with an example program	7M

UNIT-III

5.	a	Explain about inheriting private members with an example program	7M
	b	Explain about Abstract class with an example program	7M
		(OR)	
6.	a	Explain about Multilevel inheritance with an example program?	7M
	b	Explain about Hierarchical inheritance with an example program?	7M

UNIT-IV

7.	a	Explain about virtual functions and pure virtual functions with an example program?	7M
	b	Explain about this pointer with an example program?	7M
		(OR)	
8.	a	Explain about pointers to objects with an example program?	7M
	b	Explain about achieving runtime polymorphism with an example program?	7M

UNIT-V

9.	a	Explain about Generic programming?	7M
	b	Explain about Exception handling ?	7M
		(OR)	
10.	a	Explain about reading content of a file with example program?	7M
	b	Explain about class template with an example program	7M

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ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
COMPLEX VARIABLES AND STATISTICAL METHODS
(Common to CE & ME)

Time: 3 Hours   Max Marks: 70

PART-A

ANSWER ALL QUESTIONS   [1 x 10 = 10 M]

1. a) State Cauchy Riemann equations in polar form.
   b) Define Essential singularity.
   c) State Cauchy Residue theorem.
   d) What is meant by Bilinear transform?.
   e) What is meant by simple pole of f(z) ?.
   f) State Laurent's theorem.
   g) State multiplication theorem on probability.
   h) What is the Probability mass function of Poisson distribution and write its mean and variance.
   i) Define Type - I and Type – II errors.
   j) Write any three properties of Normal distribution.

PART-B

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

UNIT-I

2. Prove that $f(z) = \begin{cases} \dfrac{x^3(1+i) - y^3(1-i)}{x^2 + y^2} & if\ z \neq 0 \\ 0 & if\ z = 0 \end{cases}$ is continuous and the   12 M

Cauchy Riemann equations are satisfied at the origin, yet $f'(0)$ does not exist.

(OR)

3. a) Determine analytic function f(z) whose real part is $e^{-x}(x \sin y - y \cos y)$.   6 M
   b) Using Cauchy's integral formula, evaluate   6 M

   $\displaystyle\int_C \frac{e^{-z}}{(z-2)^2 (z-1)} dz$, where $C : |z| = \dfrac{3}{2}$

UNIT-II

4. a) Using Cauchy Residue theorem, evaluate $\displaystyle\int_C \frac{3z^2 + z}{(z-3)^2 (z-1)} dz$, where $C : |z| = 4$ 6 M

   b) Determine the poles and residues of $f(z) = \dfrac{z^2}{(z+2)z}$ 6 M

(OR)

5. a) Using Cauchy Residue theorem, evaluate $\displaystyle\int_{-\infty}^{\infty} \frac{x^2}{(x^2+1)(x^2+4)} dx$ 6 M

   b) Using Cauchy Residue theorem, evaluate   6 M

   $\displaystyle\int_0^{2\pi} \frac{1}{1 - 2p \sin\theta + p^2} d\theta$, where $0 < p < 1$.

6. a) Explain about the transformation $w=e^z$. 6 M

b) Under the transformation $w=\dfrac{1}{z}$ find the image of the straight line 6 M

$y-x+1=0$.

(OR)

7. Find the Bilinear transformation which maps the points 12 M

$z=1,\ i,\ -1$ onto $w=i,\ 0,\ -i$.

UNIT-IV

8. a) Given P(A) = 1/2 , P(B) = 1/3 and P(AB)=1/4, find the value i) P(AUB) 6 M
ii) P (A/B) iii). P(B/A) iv). $P(\overline{A}/\overline{B})$.

b) In a bolt factory, there are four machines A , B, C, D manufacturing 20 % , 6 M
15 % ,25% and 40 % of the total output respectively. Of their outputs 5 %
,4 % ,3% and 2% in the same order are defective bolts. A bolt is chosen at a
random form the factory's production and is found defective. What is the
probability that the bolt was manufactured by machine A or machine D ?

(OR)

9. a) The following data are the number of seeds germination out of 10 on damp 6 M
filter paper 80 sets of seeds. Fit a binomial distribution to these data

x:	0	1	2	3	4	5	6	7	8	9	10
f:	6	20	28	12	8	6	0	0	0	0	0

b) In a certain factory turning out razor blades, there is a small chance of 6 M
0.002 for any blade to be defective. The blades are supplied in packets of
10, use Poisson distribution to calculate the approximate number of packets
containing no defective, one defective and two defective blades
respectively in a consignment of 10000 packets.

UNIT-V

10. a) Fit a Poisson distribution to the following data and test for its goodness of 6 M
fit at level of significance 0.05.

x :	0	1	2	3	4
f :	419	352	154	56	19

b) A sample of 100 electric bulbs produced by manufacturer A showed a 6 M
mean life time of 1190 hours and a standard deviation of 90 hours. A
sample of 75 bulbs produced by manufacturer B showed a mean life time
of 1230 hours, with a standard deviation of 120 hours. Is there a difference
between the mean life time of two brands at a significance level of 0.05.

(OR)

11. a) A machine produces 16 imperfect articles in a sample of 500. After 6 M
machine is overhauled, it produces 3 imperfect articles in a batch of 100.
Has the machine been improved?

b) Two gauge operations are tested for precision in making measurements. 6 M
One operator completes a set of 26 readings with standard deviations of
1.34 and the other does 34 readings with a standard deviation of 0.98.
What is the level of significance of this difference.

AR13

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
FLUID MECHANICS & HYDRAULIC MACHINES
(Electrical & Electronics Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

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

1. a) Define surface tension
   b) What purpose micro manometers are used?
   c) Define non-uniform flow
   d) Write three dimensional steady compressible continuity equation
   e) Define hydraulic gradient line
   f) Write Darcy Weisbach equation
   g) What is the main function of draft tube?
   h) Define unit discharge
   i) Define Mano metric efficiency
   j) Write % of slip in terms of coefficient discharge

PART-B

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

UNIT-I

2. a Explain how vacuum pressure is measured with the help of a U-tube   6M
     manometer
   b A 1mx1m thin plate, kept at a distance of 0.1 mm from a fixed plate is   6M
     towed at the rate of 500 mm/s with a force of 2N. The gap between
     the plates is filled with oil. Determine the absolute viscosity of oil.
     Hence determine the kinematic viscosity of oil, if the oil weighs 8
     KN/m^3

(OR)

3. a State the Newton's Law of viscosity. Differentiate between   5 M
     Newtonian and Non- Newtonian fluids with examples.
   b Oil having viscosity 1.2 poise and is used for lubrication in the   7 M
     clearance between a 10 cm diameter shaft and its bearing. The
     clearance is 1.0 mm and shaft rotates at 20 rpm. Determine the power
     lost due to viscosity of oil.

UNIT-II

4. a Write Euler's equation of motion along a stream line and integrate it to 6 M
     obtain Bernoulli's equation. State all assumptions made
   b A pipe of 30 cm diameter conveying 0.20 m^3 of water has a 90^0 bend 6 M
     in horizontal plane. The pressures at inlet and outlet of the bend are 30
     N/cm^2 and 0.28 N/cm^2 respectively. Find the force on the bend.

(OR)

5. a Explain how do you describe fluid flow? 6 M
   b The velocity at a point is given by $V = (4t + 3x^2 + 2y)i + (t^2 + 2xy + 3y^2)j$. Determine the local acceleration and total acceleration at a point (2,3) for t = 1.5 seconds. 6 M

UNIT-III

6. a Derive an expression for loss of energy due to friction in a pipe flow 6 M
   b Two pipes each 300 m long are available for connecting to a reservoir 6 M from which a flow of 0.085 m^3/s is required. If the diameters of the two pipes are 0.3 m and 0.15m respectively. Find the ratio of the head lost when the pipes are connected is series to the head lost when they are connected in parallel. Neglect minor losses.

(OR)

7. a Derive the equation for discharge of a liquid through a Orifice meter 7 M
   b An oil of relative density 0.90 flow through a vertical pipe of diameter 5 M 20 cm. The flow is measured by a 20 cm x 10 cm venturimeter. The throat is 30 cm above the inlet section. A differential U-tube manometer containing mercury is connected to the throat and the inlet. If coefficient of discharge is 0.99. What is the manometer reading for a flow of 50 lit/sec.

UNIT-IV

8. a Differentiate impulse and reaction turbine. 4 M
   b A Francis turbine running at 400 rpm when head available is 60 m. 8 M The inner and outer diameters are 50 cm and 100 cm respectively. The constant velocity of the flow through the runner is 10 m/s and hydraulic efficiency is 80%. Determine the inlet and outlet blade angles of the rotating blades

(OR)

9. a Derive an expression for specific speed of a turbine 6 M
   b A Pelton wheel develops 5520 kW under head of 240m at an overall 6 M efficiency of 80% when revolving at a speed of 200 rpm. Find the unit discharge, unit power and unit speed. Assume peripheral coefficient is 0.46.

UNIT-V

10. a What is the basic principle applied to find the work done on water in 6 M centrifugal pump? Explain in detail.
    b Find the number of pumps required to take water from a deep well 6 M under a total head of 89 m. All the pumps are identical and are running at 800 rpm. the specific speed of each pump is given as 25 while the rated capacity of each pump is 0.16 m^3/s.

(OR)

11. a Explain working of double acting reciprocating pump with the help of 7 M neat sketch
    b A double acting reciprocating pump having piston area 0.125 m^2 has a 5 M stroke of 0.24 m long. The pump is discharging 4.2m^3 of water per minute at 75 rpm through a height of 10m. Find the slip of the pump and the power required to drive the pump.

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AR13

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

PROBABILITY THEORY & STOCHASTIC PROCESSES
(Electronics and Communication Engineering)

Time: 3 Hours   Max Marks: 70

PART-A

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

1. a) Define equally likely events.
   b) Classify sample space and explain.
   c) Classify random variable and explain.
   d) Define Probability Mass Function
   e) Mention the reason why CDF plot have the shape of stair case.
   f) What is the name given to the second order joint central moment?
   g) Mention the condition for a function to be strict sense stationary of order 4.
   h) Determine the missing elements denoted by xx in the following autocorrelation matrix of a WSS random process $Y(t)$:

$$R_{YY} = \begin{bmatrix} 2 & 1.3 & 0.4 & xx \\ xx & 2 & 1.2 & 0.8 \\ 0.4 & 1.2 & xx & 1.1 \\ 0.9 & xx & xx & 2 \end{bmatrix}$$

   i) Why thermal noise is also called as white noise?
   j) What is the autocorrelation of Whit noise?

PART-B

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

UNIT-I

2. **a** A student buys 1000 integrated circuits (ICs) from supplier A, 2000 ICs from supplier B, and 3000 ICs from supplier C. He tested the ICs and found that the conditional probability of an IC being defective depends on the supplier from whom it was bought. Specifically, given that an IC came from supplier A, the probability that it is defective is 0.05; given that an IC came from supplier B, the probability that it is defective is 0.10; and given that an IC came from supplier C, the probability that it is defective is 0.10. If the ICs from the three suppliers are mixed together and one is selected at random, what is the probability that it is defective? given that a randomly selected IC is defective, what is the probability that it came from supplier A?   **6M**

   b State and derive Baye's theorem.   **6M**

(OR)

3. **a** The quarterback for a certain football team has a good game with probability 0.6 **6M** and a bad game with probability 0.4.When he has a good game, he throws at least one interception with a probability of 0.2; and when he has a bad game, he throws at least one interception with a probability of 0.5. Given that he threw at least one interception in a particular game, what is the probability that he had a good game?

    b Let two honest coins, marked 1 and 2, be tossed together. The four possible **6M** outcomes are $T1T2$, $T1H2$, $H1T2$, $H1H2$. ($T1$ indicates toss of coin 1 resulting in tails; similarly $T2$ etc.) We shall treat that all these outcomes are equally likely; that is the probability of occurrence of any of these four outcomes is 1/4.(Treating each of these outcomes as an event, we find that these events are mutually exclusive and exhaustive). Let the event A be 'not $H1H2$ ' and B be the event 'match'. (Match comprises the two outcomes $T1T2$, $H1H2$). Find $P(B|A)$. Are A and B independent?

UNIT-II

4. a Let the random variable X denote the number of heads in three tosses of a fair coin. **6M** (1)What is the PMF of X and sketch the PMF (2) Sketch the CDF of X.

    b Find the expected value of the uniform density function. **6M**

(OR)

5. **a** A shopping cart contains ten books whose weights are as follows: There are four **6M** books with a weight of 1.8 lbs each, one book with a weight of 2 lbs, two books with a weight of 2.5 lbs each, and three books with a weight of 3.2 lbs each.
    1) What is the mean weight of the books?
    2) What is the variance of the weights of the books?

    b Explain Gaussian distribution and density function with neat sketch.. **6M**

UNIT-III

6. a Given two random variables X and Y with the joint CDF $FXY(x, y)$ and marginal **6M** CDFs $FX(x)$ and $FY(y)$, respectively, compute the joint probability that X is greater than a and Y is greater than b.

    b The joint PMF of two random variables X and Y is given by **6M**

$$p_{XY}(x, y) = \begin{cases} \frac{1}{18}(2x+y) & x = 1, 2; y = 1, 2 \\ 0 & \text{otherwise} \end{cases}$$

1) What is the conditional PMF of Y given X?
2) What is the conditional PMF of X given Y?

(OR)

7. **a** The joint PDF of the random variables X and Y is defined as follows: **6M**

$$f_{XY}(x, y) = \begin{cases} 25e^{-5y} & 0 < x < 0.2, y > 0 \\ 0 & \text{otherwise} \end{cases}$$

1. Find the marginal PDFs of X and Y.
2. What is the covariance of X and Y

    b State and prove the properties of Co variance. **6M**

AR13

UNIT-IV

8. a Two random processes $X(t)$ and $Y(t)$ are defined as follows: **6M**

$$X(t) = A\cos(wt + \Theta)$$

$$Y(t) = B\sin(wt + \Theta)$$

where A,B, and w are constants and Θ is a random variable that is uniformly distributed between 0 and 2π Find the cross correlation function of $X(t)$ and $Y(t)$.

   b State and prove the properties of auto correlation.   **6M**

(OR)

9. **a** A random process has sample functions of the form   **6M**

$$X(t) = A\cos(wt + \Theta)$$

where w is constant, A is a random variable that has a magnitude of $+1$ and -1 with equal probability, and θ is a random variable that is uniformly distributed between 0 and 2π. Assume that the random variables A and θ are independent.

   b   If $Y_1(t)=X_1 \cos\omega t+X_2 \sin \omega t$ **6M**

$Y_2(t)=X_1 \sin \omega t+X_2 \cos \omega t$

Where X_1 and X_2 are zero means independent random variables with unity variance. Show that the random processes $Y_1(t)$ and $Y_2(t)$ are individually WSS but not jointly WSS

UNIT-V

10. a A stationary random process $X(t)$ has the power spectral density   **6M**

$$S_{XX}(w) = \frac{24}{w^2 + 16}$$

Find the mean-square value of the process.

   b Derive the noise figure is cascade amplifiers.   **6M**

(OR)

11.   Explain the following   **12M**
         a) Resistive noise b) Effective noise temperature c) Arbitrary noise sources

AR-13

Code: 13CS2004   **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, December- 2017
ADVANCED DATA STRUCTURES
(Common to CSE and IT)

Time: 3 Hours   Max Marks: 70

PART-A

Answer all questions   [10 x 1=10M]

1. a) What is meant by 2-3-4 tree
   b) Give difference between DFS and BFS
   c) What is heap
   d) How do you perform insertion operation on heap
   e) Define brute force
   f) What is digital search tree
   g) Define binomial queue
   h) State floyd's algorithm
   i) Define data structure
   j) What is meant by connected graph

PART-B

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

UNIT I

2. What is SKIP list representation? Create a list with 20,30,40,24,75,60,80? Arrange the elements in sorted order? Insert 70 in the list and delete 24 from the list

(OR)

3. Define Hash Function? Write an algorithm for construction of Hash table and give the performance analysis of hashing?

UNIT-II

4. a) Write an algorithm for searching AVL trees? Represent the balanced tree and unbalanced tree with an example
   b) Differentiate Red-Black and AVL trees with suitable examples?

(OR)

5. Write the process of Inserting an element into AVL tree? Represent LL and LR rotations with an example

UNIT-III

6. What are connected graphs? Write an algorithm for breadth first spanning tree

AR-13

(OR)

7. a) Explain about Kruskals algorithm with an example
    b) Explain about Dijkstra's algorithm with an example

UNIT-IV

8. a) What is a Queue? What is the difference between priority queue and Queue?
    b) Write an algorithm for Abstract data type specification of a max priority queue

(OR)

9.   Explain about construction of MaxHeap? Illustrate insert and delete operations
      from MaxHeap

UNIT-V

10.   Explain about brute force algorithm with suitable example

(OR)

11.   Define Tries? Explain the construction of digital search tree.

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