AR16

CODE: 16CE2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

II B.Tech I Semester Regular Examinations, October, 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 Explain the factors to be considered to decide the **Design period** for design of water treatment plant. 6M

   b Estimate the population for a design period of two decades by Arithmetical Increase, Geometrical Increase and Incremental Increase methods for the census data given below. 8M

Year:	1961	1971	1981	1991	2001	2011
Population:	1,50,000	1,80,000	2,15,000	2,55,000	2,95,000	3,45,000

   Which method do you prefer for the above data. Why?

(OR)

2. a Write about the hourly fluctuations in demand of water and explain its importance in the design of water works systems 8M

   b Write a note on water borne diseases 6M

UNIT-II

3. a Compare surface water and ground water with reference to their quality 6M

   b What are the types of layouts of distribution systems. Write their merits demerits 8M

(OR)

4. a Determine the storage capacity of a reservoir for a daily requirement of 2.5 lakh litres. The pumping is done from 8 am - 8 pm. The draw off is as follows 8M

6AM - 8AM	40% of daily supply
8AM - 5PM	25% of daily supply
5PM - 8PM	35% of daily supply.

   b Write short note on the following with the help of neat sketches 6M
   1. Sluice valve
   2. Air relief valve

UNIT-III

5. a Draw the flow diagrams of water treatment for the following. 8M
   (i) Ground water containing various salts of Ca / Mg. and Dissolved gases.
   (ii) River water with more turbidity.

   b Design a circular clarifier to treat 4 MLD of water. The OFR should not exceed 30,000 lt/sq.m./day. Suitable data may be assumed. 6M

(OR)

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

   b What do you mean by optimum dose of coagulant and how do you determine it? 6M

AR16

CODE: 16CE2005 SET-1

UNIT-IV

7.	a	List several distinctions between Slow sand filters and Rapid sand filters.	7M
	b	Write a short notes on filter troubles in operations	7M

(OR)

8.	a	Write short notes on (a) Negative head & Air binding (b) Chlorine demand & Residual Chlorine.	8M
	b	Write short note on removal of color, odor and taste from water.	6M

UNIT-V

9.	a	Describe how the solid waste is collected and transported	6M
	b	Write a short note on i) Characteristics of MSW and ii) Composting	8M

(OR)

10.	a	Write a note on Recovery and reuse of MSW	6M
	b	What are various methods of Solid waste disposal? Explain about sanitary Land fill.	8M

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AR16

CODE: 16ME2008 **SET-2**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI

(AUTONOMOUS)

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

FLUID MECHANICS & HYDRAULIC MACHINERY

(Common to EEE & ME)

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) Briefly explain Hydrostatic Law. 6M
   b) Distinguish between: (i) Steady and Un-steady flow (ii) Uniform and Non-uniform flow (iii) Laminar and Turbulent flow (iv) compressible and incompressible flow. 8M

(OR)

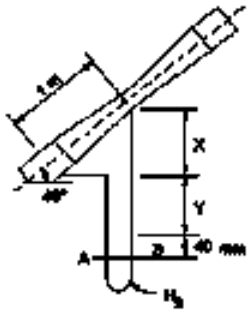
2. a) Calculate the capillary effect in millimeters in a glass tube of 6 mm diameter, when immersed in (i) water, and (ii) mercury. The temperature of the liquid is 20° C and the values of the surface tension of water and mercury at 20° C in contact with air are 0.073575 N/m and 0.61 N/m respectively. The angle of contact for water is zero that for mercury 130°. Take density of water at 20°C as equal to 998 kg/m^3. 6M
   b) Explain the terms: (i) Path line (ii) Stream line (iii) Streak line (iv) Stream tube 8M

UNIT-II

3. a) Derive the expression for the discharge through the venturimeter. 8M
   b) A pipe of diameter 400 mm carries water at a velocity of 25 m/sec. The pressures at the points A and B are 29.43 N/cm^2 and 22.563 N/cm^2 respectively while the datum head at A and B are 28 m and 30 m respectively. Find the loss of head between A and B. 6M

(OR)

4. a) State principle of conservation of energy. Derive the Bernoulli's equation for incompressible flow. 6M
   b) A venturimeter is fitted in a pipe of 30 cm diameter inclined at 40° to the horizontal to measure the flow rate of petrol having a specific gravity of 0.8. The ratio of areas of main pipe and throat is 5 and the throat is at 1 m from the inlet along its length. The difference in manometer head is 40 mm of mercury. Assuming the coefficient of discharge as 0.96. Calculate the discharge through the venturimeter and the pressure difference between the throat and the entry point of the venturimeter. 8M



UNIT-III

5. a) Derive Darcy Weisbach equation to estimate the head loss by friction. 8M
   b) A jet of water of 86 mm diameter strikes a curved vane at the centre with a velocity of 30 m/sec. The curved vane is moving with a velocity of 8m/sec in the direction of the jet. Find the force exerted on the plate in the direction of the jet, power and efficiency of the jet. Assume that the plate is smooth. 6M

(OR)

6. a) Show that the maximum efficiency attainable when a jet striking a series of moving flat vanes fitted on the periphery of a wheel is 50%. 8M
   b) Two pipes each 300 m long are available for connecting to a reservoir from which a flow of 0.085 m^3/sec is required. If the diameters of the two pipes are 0.30 m and 0.150 m respectively, determine the ratio of head lost, when pipes are connected in series to the head lost when pipes are connected in parallel. Neglect minor losses. 6M

UNIT-IV

7. a) Differentiate impulse and reaction turbines. 6M
   b) A Pelton wheel has to be designed for the followed data. Power to be developed = 6 MW. Net head available = 300 m. Speed = 550 rpm; ratio of jet diameter to wheel diameter = 1/10; and overall efficiency = 85%. Find the no. of jets; diameter of the jet; diameter of the wheel; and the quantity of water required. 8M

(OR)

8. a) A reaction turbine works at 450 rpm under a head of 120 m. Its diameter at inlet is 120 cm and the flow area is 0.4 m^2. The angles made by the absolute and relative velocities at inlet are 20^0 and 60^0 respectively with the tangential velocity. Determine (i) the volume flow rate (ii) the hydraulic power developed and (iii) the efficiency. Assume whirl at outlet to be zero. 8M
   b) Explain the governing of impulse turbine with a neat sketch. 6M

UNIT-V

9. a) What are the applications of Centrifugal pumps? Derive the expression for the work required to run centrifugal pump. 6M
   b) A single acting reciprocating pump has a 15 cm piston with a crank of radius 15 cm. The delivery pipe is 10 cm diameter. At a speed of 60 r.p.m., 310 liters/s of water is lifted to a total height of 15 m. Find the slip, coefficient of discharge and theoretical power in kW required to drive the pump. 8M

(OR)

10. a) Explain the working of a reciprocating pump with a neat sketch. Also define the efficiency of reciprocating pump. 6M
    b) Define the following: (i) manometric efficiency (ii) volumetric efficiency (iii) mechanical efficiency (iv) overall efficiency. 8M

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AR16

CODE: 16EE2005 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

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

LINEAR CONTROL SYSTEMS
(Electronics and Communication Engineering)

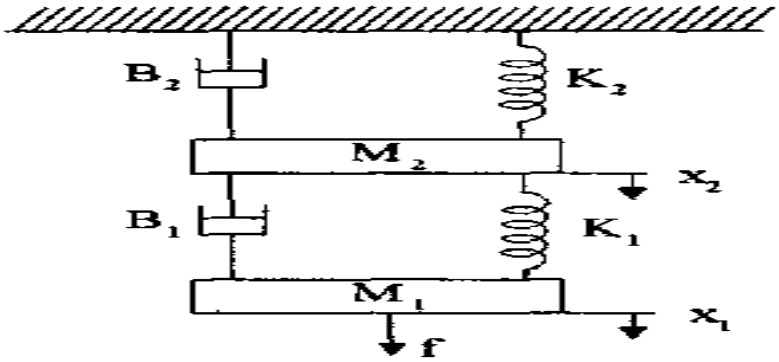
Time: 3Hours **Max Marks: 70M**

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

UNIT-I

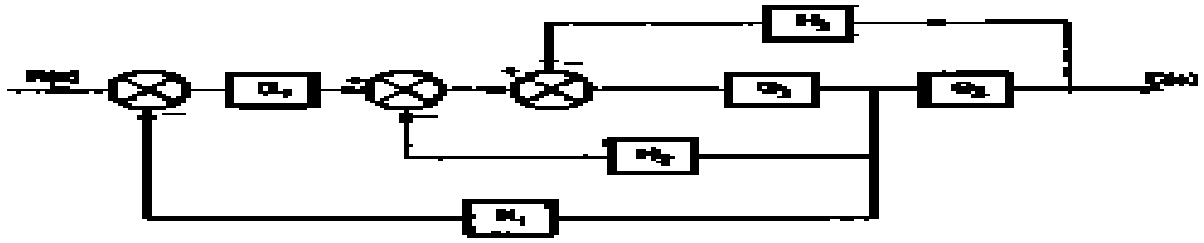
1. a) Explain in detail with a neat block diagram ,how closed loop system is more effective by taking traffic control system as an example. 6M

b) Determine the Transfer function $X_1(s) / F(s)$ for the given mechanical system 8M

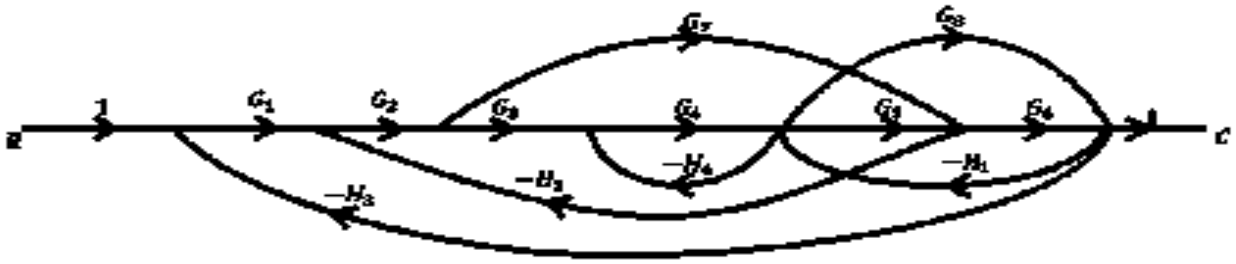


(OR)

2. a)Determin the tranfer function C(s)/R(s) of the system using block digram reduction rules. 7M



b)Determine the overall gain of the system using Masson's gain formulae. 7M



AR16

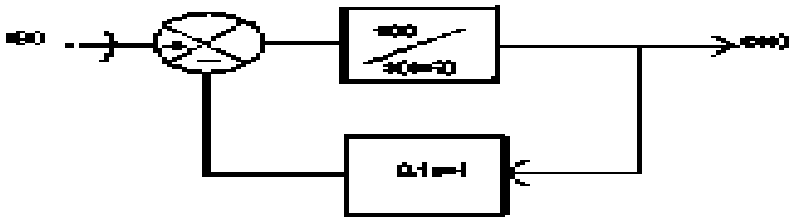
CODE: 16EE2005 SET-1

UNIT-II

3. a) Derive the transfer function of armature controlled DC servo motor and draw the block diagram. 9M
   b) Explain the operation of synchro transmitter with a neat diagram. 5M

(OR)

4. a) Derive the expression for time response of second order under damped system for unit step input and also draw the response curve. 7M
   b) A potential control system with velocity feedback is shown in fig below. What is response of the system for unit step input? 7M



UNIT-III

5. a) State and Explain Routh-Hurwitz criterion and its difficulties with example. 8M
   b) Determine the stability of the following system by using Routh –Hurwitz criterion also comment on the poles location. 6M

$$S^5 + 3S^4 + 2S^3 + 2S^2 + 4S + 9 = 0$$

(OR)

6. Sketch the root locus of the system, Find the value of K so that the damping ratio of closed loop system is 0.5 .Whose open loop transfer function is G(s)= $\frac{K}{S(S+2)(S+4)}$. 14M

UNIT-IV

7. a) Derive the expressions for Resonant peak ,Resonant frequency and Bandwidth in frequency domain analysis. 7M
   b) For the following open loop transfer function G(s)H(s) ,draw the Bode plot and obtain Gain crossover frequency, phase crossover frequency. G(s)H(s)= $\frac{20}{S(3S+1)(1+4S)}$ 7M

(OR)

8. a) Define the following. i)Gain cross over frequency ii)Phase cross over frequency iii)Gain Margin iv)Phase Margin 6M
   b) Draw the polar plot and determine the gain margin and phase margin for the system given below G(s)H(s)= $\frac{K}{(S)(S+1)(1+2S)}$ 8M

UNIT-V

9. a) Derive the expression for sate equation and output equation and obtain the state model and its State diagram for the system having m inputs and p outputs. 7M
   b) Obtain the state model and draw the state diagram for the given transfer function

   T(s)= $\frac{2}{(S^3+2S^2+4S+8)}$ (using signal flow graph or any other method) 7M

(OR)

10. a)What is lead compensator ,Derive the transfer function of lead compensator. 7M
    b) Obtain the state transmission matrix and time response of the following system with

$$\begin{bmatrix}\dot{X}_1\\ \dot{X}_2\end{bmatrix}=\begin{bmatrix}1 & 0\\ 1 & 1\end{bmatrix}\begin{bmatrix}X_1\\ X_2\end{bmatrix}+\begin{bmatrix}1\\ 1\end{bmatrix}u \quad ,X_0=\begin{bmatrix}1\\ 0\end{bmatrix}$$ 7M

**** Ordinary graphs and Semi log Graphs have to be supplied**

AR16

Code No: 16CS2004 SET-1

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

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

OBJECT ORIENTED PROGRAMMING
(Common to Computer Science & Engineering, 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 -1

1. a. Explain Object Oriented Programming Paradigm. 7M
   b. Explain User defined and derived data types with examples. 7M

(OR)

2. a. Explain Operator Overloading and Operator Precedence in C++. 8M
   b. Explain briefly control structures. 6M

UNIT – II

3. a. Define class. Write a C++ Program to create a class to get and print details of a Student. 7M
   b. Explain constructors with default arguments. 7M

(OR)

4. a. Explain the overloading of Binary operators using Friend Functions. 7M
   b. Explain in detail copy constructor and dynamic constructors. 7M

UNIT – III

5. a. Define Inheritance. Explain Hierarchical and Hybrid Inheritance with example. 7M
   b. Explain Virtual Base Classes with example. 7M

(OR)

6. a. What are derived classes? Give the syntax and example for a derived class. 7M
   b. Explain about the constructors in derived classes. 7M

UNIT – IV

7. a. Explain Virtual Functions with example. 7M
   b. Explain Virtual Destructors with example. 7M

(OR)

8. a. Explain Polymorphism concept in C++. 7M
   b. Define Pointer? Explain Pointer to Derived Class with example. 7M

UNIT – V

9. a. Explain Class Templates with multiple parameters. 7M
   b. Discuss various File Mode options. 7M

(OR)

10. a. Explain throwing and catching mechanism in Exception Handling. 7M
    b. Write a C++ program for exception handling using multiple catch statements. 7M

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AR13

CODE: 13BS2007 **SET-1**

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

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

PART-A

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

1. a) Define Analytic function
   b) Define Harmonic function
   c) Write the poles of $f(z)=\dfrac{z}{(z-1)(z+2)^2}$
   d) Find the residue of $f(z)=\dfrac{1}{z^2-1}$ at the pole $z=1$
   e) Define translation
   f) Find the critical points $\cos z$
   g) The mean and variance of Binomial distribution are 4 and $\dfrac{4}{3}$ respectively. Find n
   h) Write the probability density function of the Normal distribution
   i) Define Null hypothesis
   j) Write test statistic for testing of difference of two means of large samples

PART-B

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

UNIT-I

2. a) Show that $f(z)=z^2$ is analytic for all z [6M]

   b) Show that $u=e^{-x}(x\sin y-y\cos y)$ is harmonic [6M]

(OR)

3. a) Evaluate $\int\dfrac{\log z\,dz}{(z-1)^3}$ around the circle $|z-1|=\dfrac{1}{2}$ by Cauchy's integral formula [6M]

   b) Find the analytic function whose real part is $y+e^x\cos y$ [6M]

UNIT-II

4. a) Evaluate $\int\dfrac{e^{2z}\,dz}{(z-1)(z-2)}$ around the circle $|z|=3$ by Residue theorem [6M]

   b) Find the Laurent series expansion of the function $\dfrac{z^2-1}{z^2+5z+6}$ about $z=0$ in the region $2<|z|<3$ [6M]

(OR)

5. Show that $\int_0^{2\pi}\dfrac{d\theta}{2+\cos\theta}=\dfrac{2\pi}{\sqrt{3}}$ [12M]

UNIT-III

6. Find the bilinear transformation which maps the point (2,1,0) into the point (1,0, i) [12M]

(OR)

7. a) Show that circles are invariant under linear transformation [6M]

b) If $w = \frac{1+iz}{1-iz}$ find the image of $|z| < 1$ [6M]

UNIT-IV

8. a) A consulting firm rents cars from three agencies, 20% from agency D, 50%from agency E and 30% from agency F. If 5% of the cars from D, 4% of the cars from E, and 8% of the cars from F have bad tires. What is the probability that the firm will get a car with bad tires [6M]

b) In a normal distribution, 7% of items are under 35 and 89% are under 64. Find the mean and S.D. of the distribution [6M]

(OR)

9. a) Find p and q for a Binomial variate X, if $n = 6$ and $9P(X = 4) = P(X = 2)$ [6M]

b) The mean of certain normal population is equal to the standard error of the mean of samples of size 64. Find the probability that the mean of the sample size 36 will be negative [6M]

UNIT-V

10. a) According the norms established for a mechanical aptitude test, persons who are 18 years old should average 73.2 with a standard deviation of 8.6. If 45 randomly selected persons of that age averaged 76.7; test the null hypothesis $\mu = 73.2$ against the alternative hypothesis $\mu > 73.2$ at the 0.01 level of significance [6M]

b) In a big city 325 men out of 600 men were found to be smokers. Does this information support the conclusion that the majority of men in this city are smokers [6M]

(OR)

11. Measuring specimen of nylon yarn from two spinning machines. It was found that eight specimens from the first machine had a mean denier of 9.67 with a s.d of 1.81 while 10 specimens from the second machine had a mean denier 7.43 with a s.d of 1.48. Assuming that the populations sampled are normal and have the same variance, test the null hypothesis $\mu_1 - \mu_2 = 1.5$ against the alternative hypothesis $\mu_1 - \mu_2 > 1.5$ at the 0.05 level of significance [12M]

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AR13

Code: 13ME2008 **SET-1**

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

FLUID MECHANICS AND HYDRAULIC MACHINES

(Electrical & Electronics Engineering)

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

PART – A

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

1. a) Define Pascal's law?
   b) What is the Difference between Gauge pressure and Vaccume pressure?
   c) Distinguish between rotational and irrotational flow?
   d) What is the function of Venturimeter?
   e) Define surface tension?
   f) Define Unit quantities of hydraulic turbine?
   g) What is cavitation?
   h) Define negative slip?
   i) What is the example of reaction turbine?
   j) What are minor loses in pipes?

PART – B

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

UNIT – I

2. The dynamic viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4m and rotates at 190 rpm. Calculate the power lost in the bearing for a sleeve length of 90^0 mm. The thickness of the oil film is 1.5 mm.

(OR)

3. The right limb of a simple U-tube manometer containing mer5cury is open to the atmosphere while the left limb is connected to a pipe in which a fluid of sp/gr. 0.9 is flowing. The centre of the pipe is 12cm below the level of mercury in the right limb. Find the pressure of fluid in the pipe difference of mercury level in the two limbs is 20cm.

UNIT – II

4. Derive equation of continuity in three dimensions.

(OR)

5. A two dimensional fluid flow is described by the velocity components $u=5x^3$, $v=-15x^2y$. Evaluate the stream function. Also determine velocity and acceleration at point P(x=1m, y=2m).

UNIT – III

6. Explain the working of Orifice meter with neat sketch.

(OR)

7. Derive Darcy Weisbach equation.

UNIT – IV

8. Discuss the working principle of Kaplan turbine with a neat sketch.

(OR)

9. A pelton wheel is revolving at a speed of 200rpm and develops 7500KW when working under a head of 200m with an overall efficiency of 90%. Determine unit speed, unit discharge and unit power. Find the speed, discharge and power when this turbine is working under a head of 160m.

UNIT – V

10. Explain the performance characteristic curves of centrifugal pump.

(OR)

11. Discuss the working principle of reciprocating pump.

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AR13

CODE: 13EC2005 **SET-1**

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)
II B.Tech I Semester Supplementary Examinations, October-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 probability using relative frequency approach
   b) Define conditional probability.
   c) Define Probability Mass Function
   d) Classify random variables and explain.
   e) Mention the condition for a joint distribution function to be independent functions
   f) What is the name given to the second order joint central moment?
   g) Determine the missing elements denoted by *xx* in the following autocorrelation matrix of a WSS random process $Y(t)$:

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

   h) Mention the condition for a process to be stationary to order two.
   i) What is the autocorrelation of Whit noise?
   j) Why thermal noise is also called as white noise?

PART-B

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

UNIT-I

2. **a** . Explain the following with examples **8M**
   a) Probability b) Joint probability c) Independent events
   d) Mutually exclusive

   b Derive total probability theorem **4M**

(OR)

3. **a** A company producing electric relays has three manufacturing plants producing 50, 30 and 20 percent respectively of its product. Suppose the probabilities that a relay manufactured by these plants is defective are 0.02, 0.05 and 0.01 respectively. **6M**

   1) If a relay is selected at random from the output of the company, what is the probability that it is defective?

   2) If a relay selected at random is found to be defective, what is the probability that it was manufactured by plant 2?

   b Let two honest coins, marked 1 and 2, be tossed together. The four possible 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? **6M**

UNIT-II

4. a $Y = g(X) = X + a$, where' a' is a constant. Let us find $f_Y(y)$. **6M**

   b The CDF of the random variable X is given by **6M**

$$F_X(x) = \begin{cases} 0 & x < 0 \\ x + \frac{1}{2} & 0 \le x \le \frac{1}{2} \\ 1 & x > \frac{1}{2} \end{cases}$$

   1) Draw the graph of the CDF
   2) Compute P(X > ¼)

(OR)

5. Find the expected value and variance of the random variable K the following pmf **12M**

$$p_K(k) = \frac{\lambda^k}{k!} e^{-\lambda} \quad k = 0, 1, 2, \ldots$$

UNIT-III

6. a Given two random variables X and Y with the joint CDF $FXY(x, y)$ and marginal CDFs $FX(x)$ and $FY(y)$, respectively, compute the joint probability that X is greater than a and Y is greater than b. **4M**

   b The joint PMF of two random variables X and Y is given by where k is a constant. **8M**

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

   1) What is the value of k?
   2) Find the marginal PMFs of X and Y.
   3) Are X and Y independent?

(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 Let X and Y have the joint PDF **6M**

$$f_{X,Y}(x, y) = \begin{cases} x + y, & 0 < x < 1, 0 < y < 1 \\ 0 & , \text{ elsewhere} \end{cases}$$

Let us find 1) $E[XY^2]$ and 2) ρ_{xy}

UNIT-IV

8. 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.

   1) Is $X(t)$ a wide-sense stationary process?
   2) Is $X(t)$ a mean-ergodic process?

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

(OR)

9. **A** A random process has the autocorrelation function **6M**

$$R_{XX}(\tau) = \frac{4\tau^2 + 6}{\tau^2 + 1}$$

Find the mean-square value, the mean value and the variance of the process.

b 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 $Y(t)$.

UNIT-V

10. a Let $Y(t) = X(t) + N(t)$ be a wide-sense stationary process where $X(t)$ is the actual signal and $N(t)$ is a zero-mean noise process with variance σ^2 and independent of $X(t)$. Find the power spectral density of $Y(t)$. **6M**

b Derive the expression for noise equivalent bandwidth. **6M**

(OR)

11. **a** Determine the autocorrelation function of the random process with the power spectral density given by **6M**

$$S_{XX}(w) = \begin{cases} S_0 & |w| < w_0 \\ 0 & \text{otherwise} \end{cases}$$

b State and prove the properties of Power Spectral Density. **6M**

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AR13 Set 01

Code: 13CS2004

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

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

PART – A

Answer all Questions **[10X1=10M]**

1. a) Distinguish between tree and graph?
   b) Define balance factor.
   c) Define set and dictionary.
   d) Define min-heap.
   e) What is stack?
   f) What is a spanning tree?
   g) What is text processing?
   h) What is BFS?
   i) What is a binomial queue?
   j) What is a digital search tree?

PART-B

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

UNIT-I

2. Explain different collision resolution techniques. [12M]

(OR)

3. a) What is hash function? What is load factor? Illustrate insertion operation in skip lists with an example. [6M]
   b) Explain different methods for creating Hash functions. [6M]

UNIT-II

4. (a) Define AVL trees. Explain briefly various balancing algorithms. [6M]
   (b) Define Splay tree, 2-3 trees, 2-3-4 trees with examples. [6M]

(OR)

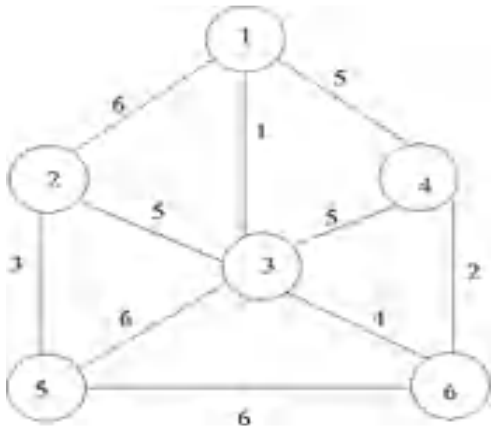
5) (a) Create an AVL tree from the following list performing all balancing. [6M]
   10, 7, 2, 20, 30, 40, 32, 56, 24, 70, 80, 90, 5
   (b) Define Red-Black trees. Illustrate insertion and deletion with suitable examples. [6M]

UNIT-III

6. (a) What is all pairs shortest path? Explain Warshall's algorithm. [6M]
   (b) Explain breadth first search algorithm. [6M]

(OR)

7. (a) Explain prim's Algorithm? Find out minimum spanning tree for the following figure. [6M]



(b) Explain Dijkstra's algorithm. [6M]

UNIT-IV

8. (a) Create a max-heap for the following list. 7, 20, 25, 30, 50, 75, 40, 80, 35, 90 [6M]
(b) What is binomial queue? Discuss binomial amortized analysis. [6M]

(OR)

9. (a) What is binomial queue? Discuss lazy binomial queues. [6M]
(b) What is priority queue? How can it be represented by a linked list? [6M]

UNIT-V

10. Explain the KMP pattern matching algorithm with example. [12M]

(OR)

11. (a) Discuss the Boyer Moore pattern matching algorithm with example. [6M]
(b) What is a patricia-trie? What is it used for? Construct a patricia-trie. [6M]