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ENGINEERING COLLEGE

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Giving Wings to Thoughts

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(For CSE, ECE & EEE)

Question bank

UNIT-1

LONG ANSWER QUESTIONS.

1 A random variables X has the following function

X	0	1	2	3	4	5	6	7
P[X]	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

    i. Determine K

    ii. Evaluate: p(X<6), p(0<X<5), p(0<X<4)

    iii. Variance and mean

2 Derive mean , variance and mode of binomial distribution

3 Two dice are thrown five times , find the probability of getting 7 as sum

    1) at least once 2) two times   3) p[1< X< 5]

4 Write about the normal   distribution .

5 Derive the mean ,variance and mode of normal distribution

6 A fair coin tossed until ahead or five tails occurs .Find the expected number E of tosses   of the coin

7 Explaine the characteristics of normal distribution.

8 Let the continuous random variable X have the probability density function,

$$f(x)=\{\frac{2}{x^2} , \quad if \quad 1< x<\infty$$

      0   ,   other wise .

    Find F(x)   ,mean

9 If the masses of 300 students are normally distributions with mean 68 kg and standard deviation 3

    kgs ,how many students have masses.

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i.   >70 kgs
ii. <or=64kgs
iii. b/w 65 and 71 kgs inclusive

SHORT ANSWER QUESTIONS

1. Explain the types random variables
2. Define moment generating function.
3. Define Geometric distribution
4. Define central moments .
5. What are the 3- axioms of probability.
6. The probability density function is $Y = K(3X^2-1)$, $-1<X<2$
$$0 , \quad , \quad \text{else where}$$
    Find the value of k

7. Explain the continuous and discrete probability distributions. Give examples.
8. . If the probability of a defective bolt is 1/8. Find mean,variance for the distribution of
9. defective bolts of 640
10. If x a continuous random variables and Y=ax +b. prove that E(Y)=aE(X)+b and
11. V(Y)=a^2V(X).
.
12. Show that the function f(x)=1/π(1+x^2),-∞<x<∞ is probability density function.

UNIT -2

SHORT ANSWER QUESTIONS

1. Define Sampling
2. Define Standard Error.
3. Define population & Sample
4. Write the properties of moment estimation
5. Write the applications of Chi-square distribution
6. Write the assumptions of t-distribution
7. What are the properties of Chi-square distribution
8. Explain the applications of F-distribution
9. Write the confidence intervals for difference of means in large samples
10. Write the confidence intervals for difference of two proportions

LONG ANSWER QUESTIONS

1   A random sample with replacement of size 2 is taken from S={1,2,3} .Let the random variable X denote the sum of the two numbers taken. Find Probability distribution.

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2   A population consists of six numbers 4,8,12,16,20,24 consider all possible samples of size 2 that can be drawn with out replacement.
  (a).population mean
  (b) population s.d
  ©mean of sampling distribution of means
  (d) s.d of sampling of distribution of means.

3 . A sample of size 10 was taken from a population s.d of sample 0.03 .Find maximum error with 99% confidence.

4. If two independent random sample of size $n_1 = 13$ and $n_2 = 7$ are taken from a normal population.what is the probability that the variance of the first sample will be atleast four times as that of the second sample.

5.   Discuss about t-distribution,write the properties.

6. A random sample of size 25 from a normal population has the mean 47.5 and s.d 8.4.Does this information tend to support or refute the claim that the population mean is 42.1

7.   Prove that s^2 is an unbiased estimator of population variance.

8.   A random sample of size 100 has s.d of 5 .What can you say about maximum error with 95% confidence.

1.   The mean and s.d of a population are 11795 and 14054 respectively.If n= 50 find 95% confidence interval.

10 .Write the properties of good estimator.

11 Discuss about F and chi-square distribution.

UNIT -3

SHORT ANSWER QUESTIONS

1. Define null hypothesis & alternative hypothesis
2. Define Type-I & Type-II errors
3. Explain the general procedure of testing of hypothesis
4. Explain maximum likelyhood estimation procedure
5. Write the test statistic for difference of proportions
6. What is meant by level of significance.
7. Write about one tailed and two tailed alternatives.
8. Write the assumption of ANOVA.

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LONG ANSWER QUESTIONS

1. **W**rite the test procedure for single mean.
2. A researcher wants to know the intelligence of students in a school. He selected 2 groups of Students .Inthe first group there are 150 students having mean I.Q of 75 with a S.D of 15. In the second group there are 250 students having mean I.Q of 70 with S.D of 20.Test the Hypothesis.
3. In a sample of 600 students of certain college 400 are found to use ball pens. In another College ,from a sample of 900 students 450 were found to use ball pens.Test whether 2 colleges are significantly different with respect of using ball pens.
4. A sample of 400 mail students is found to have a mean height of 171.38 c.m.Can it be reasonably regarded as a sample from large population with mean height 171.17c.m and s.d 3.30 .

5. A machine putsout 16 imperfect articles in a sample of 500 articles.After the machine is overhauled it puts out 3 imperfect articles in a sample of 100 articles.Has the machine improved.
6. Construct and explainone way ANOVA table.
7. The three samples below have been obtained from normal populations with equal variances

Sample1	Sample2	Sample3
8	7	12
10	5	9
7	10	13
14	9	12
11	9	14

Test the hypothesis at 5% level .

8. In a big city 325 men out of 600 were found to be smokers.Does this information support the conclusion that the majority of men in this city are smokers.
9. Among 900 people in state 90 were found to be chapathi eaters.construct 99% confidence interval.

10. Write test procedure fo difference of proportions.

UNIT - 4

LONG ANSWER QUESTIONS

1. Derive the normal equation to fit the parabola $y = a + bx + cx^2$

2. Fit a Straight line to the following data by the method of least squares

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x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.5

3 Fit a curve of the form $y = ae^{bx}$ to the following data

x	0	1	2	3
y	1.05	2.10	3.85	8.30

4 Find a and b so that $y = ab^x$ best fits the following data

x	0.2	0.3	0.4	0.5	0.6	0.7
y	3.16	2.38	1.75	1.34	1.00	0.74

5 The variables x and y are related by $y(x) = ax^b$

X	3	4	5	6	7
Y(x)	6	9	10	11	12

6 Find out the square root of 25 given $x_0=2, x_1=7$ using Bisection method

7 Find a real root of an equation log x =cos x using Regula falsi method

8 Find a real root of an equation $x^3-2x^2-4=0$ using iteration method

9   Find a real root of an equation $xe^x -cosx=0$ using Newton Raphson method

10 Using Gauss seidel iterative method solve the equations 5x-2y+3z=-1,-3x+9y+z=2,

2x-y-7z=3

11 Fit a straight line to the form $y = a + bx$ for the following data

x	0	5	10	15	20	25
y	12	15	17	22	24	30

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12 By the method of least squares fit a parabola of the form $y = a + bx + cx^2$ for the Following data

x	2	4	6	8	10
y	3.07	12.85	31.47	57.38	91.29

13 Fit the curve $y = ae^{bx}$ to the following data

x	0	1	2	3	4	5	6	7	8
y	20	30	52	77	135	211	326	550	1052

SHORT ANSWER QUESTIONS

1. State the Method of least squares
2. Write the Normal equations to fit the straight line y=a+bx
3. Write the Normal equations to fit the curves $y=ax^c$, $y=ae^{bx}$
4. Fit a Straight line to the following data by the method of least squares

x	0	1	2	3	4
y	1	1.8	3.3	4.5	6.5

5. Define Algebraic & Transcendental functions
6. Define root of an equation
7. Define Iterative process.
8. Write the Merits & Demerits of Newton Raphson method
9. Define diagonally dominant system
10. Comparison between Gauss Seidel Method & Jacobi's Method

Unit -5

LONG ANSWER QUESTIONS

1. Solve $\frac{dy}{dx} = x - y^2$ by Taylor's series method for x = 0.2 to 0.6 with h = 0.2, given y(0) = 1
2. Solve $y^1 = y - x^2$, y(0) = 1 by Picard's method up to the fourth approximations. Hence find the value of y(0.1) & y(0.2)

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3. Find the solution of $\dfrac{dy}{dx} = x - y, y(0) = 1$ at x=0.1,0.2,0.3,0.4 & 0.5 using modified Euler's method

4. Find y(0.1) & y(0.2) using Runge – Kutta 4th order formula given that $y^1 = x^2 - y$ & y(0) =1

5. Evaluate $\int_0^1 \dfrac{1}{1+x}$ dx using (i) Trapezoidal rule (ii) Simpson's $\dfrac{1}{3}$ rule &(iii)Simpson's $\dfrac{3}{8}$ rule

6. Find out the square root of 25 given $x_0=2, x_1=7$ using Bisection method

7. Find a real root of an equation log x =cos x using Regula falsi method

8. Find a real root of an equation $x^3 - 2x^2 - 4 = 0$ using iteration method

9. Find a real root of an equation $xe^x - \cos x = 0$ using Newton Raphson method

10. Solve the equations 5x-y+3z=10,3x+6y=18 , x+y+5z=-10 using Jacobi's method with (3,0,-2) as the initial approximation

11. Using Gauss seidel iterative method solve the equations 5x-2y+3z=-1,-3x+9y+z=2,2x-y-7z=3

12. Find the solution of $\dfrac{dy}{dx} = x - y$ at x=0.4 subject to the condition y=1 at x=0 and h=0.1 using Milne's method. Use Modified Euler's method to evaluate y(0.1),y(0.2)&y(0.3)

SHORT ANSWER QUESTIONS

1. What is meant by Numerical Differention
2. Define Numerical Integration
3. Evaluate $\int_0^1 x^3 dx$ using Trapezoidal rule.
4. Write the merits and demerits of the Taylor's series
5. Write the advantages of Runge-Kutta method over Taylor's series
6. Derive a formula to find the cube root of N using Newton Raphson method
7. State Trapezoidal rule
8. Explain Tailor's series method for solving an initial value problem
9. Explain Euler's and Modified Euler's method to solve an initial value problem
10. Find a positive root of the following equation by bisection method $x^3 - x^2 - 1 = 0$
11. Find the positive root of $x^3 = 2x + 5$ by false position method
12. Find a positive root of the eq by iteration method 3x=cosx+1
14. Find a real root of $xe^x - \cos x = 0$ by Newton Raphson method
15. Given y1 = x + sin y, y(0) = 1 compute y(0.2), y(0.4) with h = 0.2 using Euler's modified method