

**Even Semester Theory Examination, 2019-20**  
**(COVID Impacted Session)**

**This File contains:**

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|--|------------------|
| 1. Structure/Format of Question Papers       | Page: <b>2</b>   |
| 2. Sample Question Paper (70 Mark, 2 hours)  | Page: <b>3-4</b> |
| 3. Sample Question Paper (100 Mark, 2 hours) | Page: <b>5-6</b> |

**Structure/Format of Question Papers**  
**(COVID Impacted Session)**

1. All the Question Papers will be of TWO hours duration.
2. There shall be **TWO** questions.
3. **Question 1** will have **12 (TWELVE) parts** out of which **8 (EIGHT) parts** will have to be answered by the students.
  - There will be **at least TWO parts** from **each Unit** of the Syllabus.
  - All Parts of this question will be of **Short Answer Type** questions.
  - **Expected solving time** for each part will be approximately **8 minutes**, thus requiring **64 minutes** for the **Question 1**.
4. **Question 2** will have **5 (FIVE) parts** out of which **3 (THREE) parts** will have to be answered by the students.
  - There will be exactly **ONE question** from each Unit of the Syllabus.
  - All parts of this question will be of **Moderate Answer Type** questions.
  - **Expected solving time** for each part will be approximately **15 minutes**, thus requiring **45 minutes** for the **Question 2**.
5. **Distribution of Marks** will be as follows.
  - a. **For 70 Marks question paper:**  
Question 1: 5 marks \* 8 parts = 40 Marks.  
Question 2: 10 marks \* 3 parts = 30 Marks.
  - b. **For 100 Marks question paper:**  
Question 1: 8 marks \* 8 parts = 64 Marks.  
Question 2: 12 marks \* 3 parts = 36 Marks.
6. Sample question papers outlining the structure of a typical question paper for 70 Marks subject and 100 marks subjects are given for reference at page 3 and page 5 respectively.

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**Sample Question Paper**  
**For subjects of 70 Marks (2 hours) Question Papers**

**B.Tech/ M.Tech./MCA**  
**(SEM VIII) EVEN SEMESTER EXAMINATION 2019-20**  
**SUBJECT NAME**

[TIME: 2 hrs.]

[Max. Marks: 70]

Note: Attempt All Questions.

**Question 1.**

**5 x 8 = 40**

This question contains *Twelve* Parts. Answer **any EIGHT** parts. Each part carries **5 Marks**.

- (a) Explain the following terms.  
Rate of Convergence, Truncation Error
- (b) Show at least one scenario through graphical sketch when choice of initial guess in Newton Raphson method may lead to divergence or endless cycle.
- (c) Performing three iteration of the bisection method, find the one real root of the given equation in the interval **[0, 4]**.  
$$x^3 - 3x^2 + 1 = 0$$
- (d) What do you understand by ill-conditioned system of equations?
- (e) Find the unique polynomial **P(x)** of degree **2** or less using the Lagrange interpolation method such that **P(1) = 1, P(3) = 27, P(4) = 64**.
- (f) Prove the following relation between forward difference operator and backward difference operator.  
$$\Delta + \nabla = \Delta / \nabla - \nabla / \Delta$$
- (g) Explain the principle of least squares for curve fitting.
- (h) Express  $x^2$  in terms of Chebyshev polynomials.
- (i) Write the Trapezoidal Formula to find integration of any given function.
- (j) Compare the local errors in the Trapezoidal Rule and Simpson's 1/3 rule of integration.
- (k) Prove that if every number in a sequence is multiplied by a nonzero constant, the moving average is also multiplied by this constant.
- (l) Define the following terms.  
Type-II Error, Level of significance

**Question 2.**

**10 x 3 = 30**

This question contains *Five* parts. Answer **any THREE** parts. Each part carries **10 Marks**.

- (a) Perform three iterations of the Newton Raphson method with initial guess of **3** to find the approximate value of cube root of **23**.

- (b) Using Gauss elimination method with partial pivoting, solve the following system of simultaneous equations

$$\begin{aligned} x + y - z &= 2 \\ 2x + 3y + 5z &= -3 \\ 3x + 2y - 3z &= 6 \end{aligned}$$

- (c) Using the principle of least squares fit, find an equation of the form  $y = a + bx$  that fits best the given data.

<b>X</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Y</b>	<b>21</b>	<b>11</b>	<b>7</b>	<b>6</b>

- (d) Evaluate the following integral using Simpson's 1/3 method taking stepsize  $h = 0.5$ .  
 $I = \int_0^2 dx / (x^2 + 2x + 10)$

- (e) Following table shows the observed and expected frequencies in tossing a dice 120 times. Test the hypotheses that dice is fair, using significance level of 0.05.

<b>Face</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Observed Frequency</b>	25	17	15	23	24	16
<b>Expected Frequency</b>	20	20	20	20	20	20

Given that for 5 degrees of freedom, value of chi-square ( $\chi^2$ ) at 0.95 and at 0.05 are 11.1 and 1.15 respectively.

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**Sample Question Paper**  
**For subjects of 100 Marks (2 hours) Question Papers**

MBA  
(SEM IV) EVEN SEMESTER EXAMINATION 2019-20  
SUBJECT NAME

[TIME: 2 hrs.]

[Max. Marks: 100]

Note: Attempt All Questions.

**Question 1.**

**8 x 8 = 64**

This question contains *Twelve* Parts. Answer **any EIGHT** parts. Each part carries **8 Marks**.

- (a) Explain the following terms.  
Rate of Convergence, Truncation Error
- (b) Show at least one scenario through graphical sketch when choice of initial guess in Newton Raphson method may lead to divergence or endless cycle.
- (c) Performing three iteration of the bisection method, find the one real root of the equation in the interval **[0, 4]**.  
$$x^3 - 3x^2 + 1 = 0$$
- (d) What do you understand by ill-conditioned system of equations?
- (e) Find the unique polynomial **P(x)** of degree **2** or less using the Lagrange interpolation method such that **P(1) = 1, P(3) = 27, P(4) = 64**.
- (f) Prove the following relation between forward difference operator and backward difference operator.  
$$\Delta + \nabla = \Delta / \nabla - \nabla / \Delta$$
- (g) Explain the principle of least squares for curve fitting.
- (h) Express **x<sup>2</sup>** in terms of Chebyshev polynomials.
- (i) Write the Trapezoidal Formula to find integration of any given function.
- (j) Compare the local errors in the Trapezoidal Rule and Simpson's 1/3 rule of integration.
- (k) Prove that if every number in a sequence is multiplied by a nonzero constant, the moving average is also multiplied by this constant.
- (l) Define the following terms.  
Type-II Error, Level of significance

**Question 2.**

**12 x 3 = 36**

This question contains *Five* parts. Answer **any THREE** parts. Each part carries **12 Marks**.

- (a) Perform three iterations of the Newton Raphson method with initial guess of **3** to find the approximate value of cube root of **23**.

- (b) Using Gauss elimination method with partial pivoting, solve the following system of simultaneous equations

$$\begin{aligned} x + y - z &= 2 \\ 2x + 3y + 5z &= -3 \\ 3x + 2y - 3z &= 6 \end{aligned}$$

- (c) Using the principle of least squares fit, find an equation of the form  $y = a + bx$  that fits best the given data.

<b>X</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Y</b>	<b>21</b>	<b>11</b>	<b>7</b>	<b>6</b>

- (d) Evaluate the following integral using Simpson's 1/3 method taking stepsize  $h=0.5$ .

$$I = \int_0^2 dx / (x^2 + 2x + 10)$$

- (e) Following table shows the observed and expected frequencies in tossing a dice 120 times. Test the hypotheses that dice is fair, using significance level of 0.05.

<b>Face</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Observed Frequency</b>	25	17	15	23	24	16
<b>Expected Frequency</b>	20	20	20	20	20	20

Given that for 5 degrees of freedom, value of chi-square ( $\chi^2$ ) at 0.95 and at 0.05 are 11.1 and 1.15 respectively.

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