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FACULTY OF SCIENCE

B.Sc. (III Year) Examination

MATHEMATICS

Paper III

(Linear Algebra, Multiple Integrals and Vector Calculus)

Time: 3 *Hours*]   [*Max. Marks*: 100

Section A – (Marks: 4 × 12 = 48)

Answer any **four** *questions.*

1. Is the set $\{(1, 0, -1) (2, 5, 1) (0, -4, 3)\}$ base for R^3? Justify.

2. The Linear transformation $T : R^3 \to R^3$ is defined by $T (x, y, z) = (x + 2y - z, y + z, x + y - z)$. Then find the Range of T, Nullity of T.

3. Find the Eigen values of $A = \begin{bmatrix} 20 & 18 \\ -27 & -25 \end{bmatrix}$.

4. $\alpha = (2, 1 + i, i)$, $\beta = (2 - i, i, 1 + 2i)$ are the vectors in $V_3(c)$. Then find (α, β), $\| \alpha \|$ and $\| \beta \|$.

5. $f = (2x + 3y + \lambda z) i + (\mu x + 2y + 3z) j + (2x + \gamma y + 3z) k$, then find the values of λ μ, γ.

6. Prove that $\nabla.(\phi \overline{A}) = (\nabla \phi).\overline{A} + \phi(\nabla.\overline{A})$.

7. C be a curve $y = 2x^2$ from $(0, 0)$ to $(1, 2)$ in xy-plane. Then find $\int_C (3xy \, dx - y^2 \, dy)$.

8. Compute $\iint y \cdot e^{xy} dxdy$ on $[0, a; 0, b]$.

Section B – (Marks: 2 × 26 = 52)

Answer any **two** *questions.*

9. Linear transformation $T : V_2(R) \to V_3(R)$ is defined by $T (a,b) = (a + b, a - b, b)$. Then find the Range, Nullity, Rank, zero subspace of 'T'.

10. By using Gram-Smidth method find the orthonormal basis of innerproduct space $V_3(R)$ where $\beta_1 = (2, 0, 1)$, $\beta_2 = (3, -1, 5)$, $\beta_3 = (0, 4, 2)$.

11. Find $\iint xy (x + y) dxdy$ on the domain defined in between $y = x^2$ and $y = x$.

12. (a) Prove that curl $(A \times B)$ A div B – B div A + $(B\nabla)A - (A.\nabla)B$.

    (b) Prove that curl $(grad \phi) = 0$.

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TELUGU VERSION

విభాగము A – (మార్కులు : $4 \times 12 = 48$)

ఏవేని **నాలుగు** ప్రశ్నలకు సమాధానములు వ్రాయుము.

1. $\{(1, 0, -1) (2, 5, 1) (0, -4, 3)\}$ అనే సమితి R^3 కి ఒక ఆధారం అగునా? కాదా? తెలుపుము.

2. $T : R^3 \rightarrow R^3$ అను రుజు రూపాంతరం $T(x, y, z) = (x + 2y - z, y + z, x + y - z)$ గా నిర్వచితమైన, T యొక్క వ్యాప్తి T యొక్క శూన్యాంతరాళంలు కనుగొనుము.

3. $A = \begin{bmatrix} 20 & 18 \\ -27 & -25 \end{bmatrix}$ యొక్క లాక్షణిక విలువలను కనుగొనము.

4. $V_3(c)$ లో $\alpha = (2, 1 + i, i)$, $\beta = (2 - i, i, 1 + 2i)$ సదిశలయితే (α, β), $\| \alpha \|$ మరియు $\| \beta \|$ లను కనుక్కోండి.

5. f సదిశ భ్రమణ రహితాత్మకమయినపుడు

    $f = (2x + 3y + \lambda z) i + (\mu x + 2y + 3z) j + (2x + \gamma y + 3z) k$, అయిన λ μ, γ విలువలను కనుగొనుము.

6. $\nabla.(\phi\overline{A}) = (\nabla\phi).\overline{A} + \phi(\nabla.\overline{A})$ అని చూపుము.

7. $(0, 0)$ నుండి $(1, 2)$ వరకు xy–తలంలో $y = 2x^2$ వక్రం C అయినప్పుడు $\int\limits_C (3xy \, dx - y^2 \, dy)$ ని గణించండి.

8. $[0, a; 0, b]$ పైన $\iint y . e^{xy} dx dy$ ని గణించండి.

విభాగము B – (మార్కులు : $2 \times 26 = 52$)

ఏవేని **రెండు** ప్రశ్నలకు సమాధానములు వ్రాయుము.

9. $T : V_2(R) \rightarrow V_3(R)$ అనే ఋజు పరివర్తన $T(a,b) = (a + b, a - b, b)$ అని నిర్వచింపబడితే 'T' యొక్క వ్యాప్తిని, శూన్యతను కోటిని శూన్య ఉపాంతరాళాన్ని కనుక్కోండి.

10. గ్రామ్-స్మిడ్ పద్ధతిని ఉపయోగించి $\beta_1 = (2, 0, 1)$, $\beta_2 = (3, -1, 5)$, $\beta_3 = (0, 4, 2)$ సదిశలకు, ప్రమాణ అంతర లబ్ధంతో $V_3(R)$ కు ఒక లంబాభిలంబ ఆధారను కనుగొనుము.

11. $y = x^2$ మరియు $y = x$ ల మధ్య నిర్వచింపబడిన ప్రదేశముపై $\iint xy (x + y) dx dy$ ను ఉత్పాదించుము.

12. (a) curl $(A \times B)$ A div B – B div A + $(B\nabla)A - (A.\nabla)B$ అని చూపుము.

    (b) curl (grad ϕ) = 0 అని చూపుము.

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FACULTY OF SCIENCE
B.Sc. (III Year) Examination
MATHEMATICS
Paper IV
(Numerical Analysis)

Time: 3 *Hours*] [*Max. Marks*: 100

Section A – (Marks: $4 \times 12 = 48$)

Answer any **four** *questions.*

1. If $u = 3v^7 - 6v$, find the percentage error in u at $v = 1$, if the error in v is 0.05.

2. Find a positive root of the equation by iteration method $3x = \cos x + 1$.

3. Estimate the missing term in the following table:

x	0	1	2	3	4
y = f (x)	1	3	9	?	81

4. Prove that $1 + \mu^2\delta^2 = \left[1 + \dfrac{1}{2}\delta^2\right]^2$.

5. Fit a second degree parabola to the following:

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

6. Evaluate the integral $\displaystyle\int_{4}^{5.2} \log x \, dx$, using Weddle's rule.

7. Solve the following system of equations by Gauss elimination method $3x + y - z = 3$, $2x - 8y + z = -5$, $x - 2y + 9z = 8$.

8. Find y (0.1), y (0.2) and y (0.3) with h = 0.1 using Euler's method $\dfrac{dy}{dx} + 2y = 0$, y (0) = 1.

Section B – (Marks: $2 \times 26 = 52$)

Answer any **two** *questions.*

9. Using Ramanujan method find the smallest root of the equation $f(x) = x^3 - 6x^2 + 11x - 6 = 0$.

10. Using the following data find f (x) as a polynomial in power of (x – 5).

f (0) = 4, f (2) = 36, f (3) = 58, f (4) = 112, f (7) = 466, f (a) = 922

[P.T.O.

11. Find $\dfrac{dy}{dx}$ at x = 1.5 from the following table:

x	1.5	2.0	2.5	3.0	3.5	4.0
f (x)	3.375	7.000	13.625	24.000	38.875	59.000

12. Use Picard's method to approximate y when x = 0.2 given that y = 1 when x = 0 at

$$\frac{dy}{dx} = x - y.$$

TELUGU VERSION

విభాగము A – (మార్కులు : 4 × 12 = 48)

ఏవేని **నాలుగు** (4) ప్రశ్నలకు సమాధానములు వ్రాయుము.

1. $u = 3v^7 - 6v$ అయితే v = 1 మరియు v = 0.05 వద్ద u దోషశాతము కనుగొనుము.

2. పునరుక్త పద్ధతినుపయోగించి 3x = cos x + 1 సమీకరణానికి ధన మూలాన్ని కనుక్కోండి.

3.

x	0	1	2	3	4
y = f (x)	1	3	9	?	81

పై పట్టికలోని తప్పిన పదములను కనుక్కోండి.

4. $1 + \mu^2\delta^2 = \left[1 + \dfrac{1}{2}\delta^2\right]^2$ అని చూపండి.

5.

x :	0	1	2	3	4
y :	1	1.8	1.3	2.5	6.3

పై దత్తాంశమును ఉపయోగించి పరావలయంను సంధానించుము.

6. వెడల్స్ సూత్రంను ఉపయోగించి $\displaystyle\int_{4}^{5.2} \log x \, dx$ విలువను కనుక్కోండి.

7. $3x + y - z = 3,\ 2x - 8y + z = -5,\ x - 2y + 9z = 8$

పై సమీకరణ గాస్ లుప్త పద్ధతి ద్వారా సాధించండి.

8. $\dfrac{dy}{dx} + 2y = 0,\ y(0) = 1$ అయినపుడు అయిలర్ పద్ధతిని ఉపయోగించి y (0.1), y (0.2) మరియు y (0.3) విలువలను కనుక్కోండి, h = 0.1 అయినప్పుడు

విభాగము **B** – (మార్కులు : 2 × 26 = 52)

ఏవేని **రెండు** (2) ప్రశ్నలకు సమాధానములు వ్రాయుము.

9.   f (x) = x³ – 6x² + 11x – 6 = 0 అయితే రామానుజన్ పద్ధతిని ఉపయోగించి కనిష్ఠ మూలంను కనుక్కోండి.

10.   f (0) = 4, f (2) = 36, f (3) = 58, f (4) = 112, f (7) = 466, f (a) = 922

పై విలువలను ఉపయోగించి f (x) బహుపదిని (x – 5) యొక్క ఘాతములలో విస్తరించుము.

11.
x	1.5	2.0	2.5	3.0	3.5	4.0
f (x)	3.375	7.000	13.625	24.000	38.875	59.000

పై దత్తాంశం నుపయోగించి x = 1.5 వద్ద $\frac{dy}{dx}$ ను కనుక్కోండి.

12. $\frac{dy}{dx}$ = x – y, x = 0 వద్ద y = 1 ఇవ్వబడినవి. అయితే పికార్డ్స్ పద్ధతిని ఉపయోగించి x = 0.2 వద్ద y యొక్క విలువను కనుగొనుము.

FACULTY OF SCIENCE
B.Sc. (III Year) Examination
STATISTICS
Paper III
(Applied Statistics)

Time: 3 Hours]   [Max. Marks: 100

Section A – (Marks: $4 \times 12 = 48$)

Answer any **FOUR** questions.

1. Explain principle steps in sample surveys also discuss need for sampling.

2. What is stratified random sampling? Explain proportion and optimum allocations.

3. Describe the layout of LSD with an example.

4. Fill in the blanks in the following RBD table.

S.No	Source of variation	Degrees of freedom	Sum of Squares	Mean sum of squares	Variance ratio (F)
1	Treatments	4	___	6.86	____
2	Blocks	__	___	____	44.6
3	Error	16	___	2.285	
4	Total	24	471.44		

5. Explain ratio to trend method.

6. From the following data construct the cost of living index.

Group	Index number	Weights
Food	352	48
Fuel and lighting	200	10
Clothing	230	08
House rent	160	12
Miscellaneous	190	15

7. Explain Census method and sample survey methods in vital statistics.

8. Explain Pareto law of income distribution.

SECTION-B (Marks $2 \times 26 = 52$)

Answer any **TWO** questions.

9. Explain simple random sampling with and without replacement.
    With usual notations prove that $E(s^2) = S^2$

10. Discuss the assumptions of analysis of variance. Explain the analysis of variance of two-way classified data with one observation per cell.

11. What is time series? Explain various components in time series data with examples.

12. Explain a life table and describe various notations and terminology used in life table.

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FACULTY OF SCIENCE
B.Sc. (III Year) Examination
STATISTICS
Paper IV
(Quality, Reliability and Operations Research)

Time: 3 Hours] [Max. Marks: 100

Section A – (Marks: $4 \times 12 = 48$)

Answer any **FOUR** questions.

1. Explain chance causes and assignable causes of variations in the quality of a product.

2. Derive the control limits of range-chart.

3. Explain AQL and LTPD also give its importance in sampling plan.

4. Explain system reliability of parallel.

5. Explain the concept of artificial variables also write Big-M method algorithm.

6. Explain Balanced and unbalanced Transportation problem give one example for it.

7. Discuss Hungarian Assignment method.

8. What is job sequencing? Explain Jeanson's method for solving n- jobs 3- machines problem.

SECTION-B (Marks $2 \times 26 = 52$)

Answer any **TWO** questions.

9. What is control chart? Explain the Statistical basis of Shewart control charts also derive its three sigma limits.

10. Explain:
    (a) Single sampling plan
    (b) Hazard rate function.

11. Solve the following L.P.P using Simplex method

    Maximize $z = 5x_1 + 4x_2$

    Subject to constraints

    $4x_1 + 5x_2 \leq 10$
    $3x_1 + 2x_2 \leq 9$
    $8x_1 + 3x_2 \leq 12$

    and $x_1 \geq 0$, $x_2 \geq 0$

12. Solve the following Transportation problem.

From	To A	B	C	Supply
I	26	28	24	14
II	14	19	18	12
III	11	12	16	6
Demand	7	10	15	

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FACULTY OF SCIENCE

B.Sc. (III Year) Examination

COMPUTER SCIENCE

Paper III

(Modern Database Management System)

Time: 3 *Hours*]

[*Max. Marks* : 100

Section A – (Marks: 5 × 10 = 50)

Answer any **five** *questions.*

1. Explain the problems of file system management system.

2. Explain relational set operations.

3. Define BCNF. How does BCNF differ from 3NF? Explain with an example.

4. What is Data Modelling? Explain relational model.

5. Explain sub queries and correlated queries with examples.

6. Explain the Centralized and Client-Server architecture of a DBMS.

7. What is concurrency control? Explain its objective.

8. What are the advantages of DDBMS?

9. What data mining is and what role it plays in decision support?

10. How operational data and decision support data differ?

Section B – (Marks: 2 × 25 = 50)

Answer any **two** *questions.*

11. What do you mean by Database Management System? Explain the advantages of using a Database Management System.

12. List and explain SQL DDL and DML commands.

13. Explain database system development life cycle and explain database design strategies.

14. (a) List and explain the transparency features of a DDBMS.

    (b) Define and explain the different types of distribution transparency.

15. How SQL extensions are used to support OLAP-type data manipulations.

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FACULTY OF SCIENCE

B.Sc. (III Year) Examination

COMPUTER SCIENCE

Paper IV

(GUI Programming)

Time: 3 *Hours*]   [*Max. Marks* : 100

Section A – (Marks: 5 × 10 = 50)

Answer any **five** *questions.*

1. Explain data types available in VB in detail.

2. Discuss about continue and break statements in detail.

3. How to work with Multi-Document Interface? Explain.

4. Describe the need of Class Modules with an example.

5. Define ADO. Explain the ADO Architecture.

6. Write about the evolutions of computing architectures.

7. Describe the ActiveX Control Properties in detail.

8. How to create a ActiveX DLL component? Explain with example.

9. Define ASP. Explain the features of ASP.

10. Define DHTML. Explain the advantages of DHTML.

Section B – (Marks: 2 × 25 = 50)

Answer any **two** *questions.*

11. Discuss about different conditional and repetitive control structures in detail with suitable examples.

12. How to work with Add-Ins in VB? Explain with an example.

13. Demonstrate the procedure to create a file, reading and writing the data from/to the file.

14. Discuss in detail ActiveX EXE and ActiveX DLL. Compare and contrast them.

15. Describe the ActiveX control properties in detail with suitable example.

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