

12/12/14

QP Code: 12340

(OLD COURSE)

(3 Hours)

Total Marks: 100

N.B. (1) Question No. 1 is compulsory.

- Attempt any four out of remaining six questions.
- (3) Make suitable assumptions if required and justify the same.
- (a) Find absolute, relative and percentage error in following numbers. Determine number of significant digits.

i) a = 123.41769543

 $\bar{a} = 123.41$

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ii) b = 0.0053102500

 $\overline{b} = 0.0051$

iii) c = 450550

 $\bar{c} = 450552$

(b) Define the operators $\Delta, \nabla, \delta, \mu \& E$. Prove that

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i) $2\mu\delta = \Delta + \nabla$

interpretation.

ii) $E = 1 + \Delta$

(c) Using Picard's method solve

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 $\frac{dy}{dx} = 1 + xy$ such that y = 0 when x = 0.

(d) Derive the equation for Regula - falsi method using geometrical

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2. (a) List the bracketing methods and open methods and find the real root of the equation $x^3 - 4x - 9 = 0$ using Newton Raphson method correct to three decimal places.

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(b) Solve the following equations by Gauss - Seidel method. 27x+6y-z=85, 6x+15y+2z=72, x+y+54z=110.

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3. (a) From the following table find the number of students who obtained marks less than 45.

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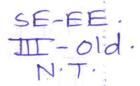
Marks	30-40	40-50	50-60	60-70
No. of students	31 .	42	51	35

(b) Using Newton's divided difference formula, find the value of f(9) from the following table.

x	5	7	- 11	13	17
f(x)	150	392	1452	2366	5202

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LM-Con.:11391-14.



2

12/12/14

QP Code: 12340

10

4. (a) Write a program for Lagrange's interpolation method and using this formula, find the value of y when x = 10 from the following table.

x	5	6	9	11
y	12	13	14	16

(b) The result of measurement of electric resistance R of a copper bar at various temperatures t^0C are listed below:

t	19	25	30	36	40	45	50	. 10
R	76	77	79	8.0	82	83	85	

Find a relation R = a + bt

5. (a) The velocity of the train which starts from rest is given by the following table, the time being reckoned in minutes from the start and speed in km/hour.

Time	3	6	9	12	15	18
Velocity	22	29	31	20	4	0

Estimate approximately the distance covered in 18 minutes by Simpson's 3/8th rule.

Solve $\frac{dy}{dx} = x + y^2$ with $x_0 = 0$, $y_0 = 1$ by Euler's modified formula find the value of y when x = 0.5 taking h = 0.25.

6. (a) Solve $\frac{dy}{dx} = x + y$ with initial conditions y(1) = 2 and find y at x = 1.2, x = 1.4 by Runge - Kutta Method of Fourth Order taking h = 0.2.

(b) Solve the following set of equations using Gauss Elimination method. 10

2x + y + z = 10, 3x + 2y + 3z = 18, x + 4y + 9z = 16.

7. (a) Explain the propagation of errors.

(b) Using Adams – Bashforth method, obtain the solution of $\frac{dy}{dx} = x - y^2$ at y(0.8), given values

x	0	0.2	0.4	0.6
y	0	0.0200	0.0795	0.1762

(c) Write a short note on Golden section search.

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5

LM-Con.:11391-14.