



A-3043

B. Sc. (Sem. III) Examination
March/April – 2015
Mathematical Methods - I (Elective Generic)
(New Course)

Time : 2 Hours]

[Total Marks : 50

Instructions :

(1)

नीचे दशांशवैक लिखनीवाणी विगतो उत्तरवही पर अवश्य लिखनी. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="text" value="B. Sc. (Sem. III)"/>	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="text" value="Mathematical Methods - I (Elective Generic) (New)"/>	<input type="text"/>
Subject Code No. : <input type="text" value="3"/> <input type="text" value="0"/> <input type="text" value="4"/> <input type="text" value="3"/>	Section No. (1, 2,.....): <input type="text" value="Nil"/>
Student's Signature	

- (2) All questions are compulsory.
- (3) Follow usual notations.
- (4) Use of non-programmable calculator is allowed.
- (5) Figures to the right indicate full marks of the question.

1 Answer any **four** as directed :

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- (1) Define finite differences.
- (2) Prove that $\delta^2 \equiv \Delta \nabla$.
- (3) Find the value of $E^2 x^3$, when the interval of differencing is unity.
- (4) Prove that $E^m E^n u(x) = E^{m+n} u(x)$.
- (5) Given $u_0 = 1, u_1 = 11, u_2 = 21, u_3 = 28, u_4 = 29$. Find u_5 .
- (6) Obtain the value of $\Delta^2(3e^x)$.

2 (a) Obtain the value of y for the following data at $x=3.4$: 7

x	3	4	5	6
y	3.614	4.604	5.857	7.451

OR

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[Contd...

- (a) Find the polynomial using Newton's forward difference formula using the following data :

x	0	1	2	3	4
$f(x)$	3	6	11	18	27

- (b) Find the value of $e^{0.45}$ using the following table : 7

x	0.1	0.2	0.3	0.4	0.5
e^x	1.1052	1.2214	1.3499	1.4918	1.648

OR

- (b) Find the value of $f(7.5)$ using the following data:

x	4	5	6	7	8
y	64	125	216	343	512

- 3** (a) The value of x and $\log_{10} x$ are given in the following table, find the value of $\log_{10} 4.7$ using Lagrange's formula : 7

x	2	3	5	7
$\log_{10} x$	0.30103	0.47712	0.69897	0.84510

OR

- (a) Express $f(x) = \frac{x^2 + x - 3}{x^3 - 2x^2 - x + 2}$ as a sum of partial fractions.

- (b) Use Newton's divided difference formula to find the polynomial from the following data : 7

x	3	2	1	-1
$f(x)$	3	12	15	-12

OR

- (b) Use Newton's divided difference formula to find the value of $f(15)$ from the following data :

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

- 4** (a) Solve the equation $y_{k+4} - 4y_{k+3} + 6y_{k+2} - 4y_{k+1} + y_k = 0$. 7

OR

- (a) Solve the equation $f(x+2) - 8f(x+1) + 15f(x) = 0$.

- (b) Use method of detached coefficient to express

$$f(x) = 2x^3 - 3x^2 + 3x - 10 \text{ in factorial notation.}$$

OR

- (b) Obtain a function whose first difference is $x^3 + 3x^2 + 5x + 12$.