51123

B. A. (Hons. English)/B. A. (Pass Course & Vocational) 5th Semester

(Regular/Re-Appear/Improvement)

Examination – December 2022

MATHS – III (NUMERICAL ANALYSIS)

Paper : BAM-503

Time : Three hours]   *[Maximum Marks : 26*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 9 (Section – V) is *compulsory.*

SECTION – I

1. (a) Given, $u_0 + u_8 = 1.9243, u_1 + u_7 = 1.9590, u_2 + u_6 = 1.9823, u_3 + u_5 = 1.9956$. Find u_4.   2.5

   (b) Given :   2.5

$\sin 45° = 0.7071, \sin 50° = 0.7660$
$\sin 55° = 0.8192, \sin 60° = 0.8660$ Find. $\sin 52°$ by using Newton's formula for forward interpolation.

2. (a) Prove that divided differences are Symmetric functions of their arguments.   2.5

   (b) Find the polynomial of lowest possible degree which assumes the values 3, 12, 15, –21 when x has the value 3, 2, 1, –1 respectively.   2.5

SECTION – II

3. Derive sterling formula and use it to find $f(35)$, given $f(20) = 512, f(30) = 439, f(40) = 346$ and $f(50) = 243$. 5

4. (a) If x follows a binomial distribution with mean 4 and variance 2, find $P(|x - 4| \le 2)$.   2.5

   (b) In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.   2.5

SECTION – III

5. Given the values of an imperial function $f(x)$ for certain values of x, find $f'(93)$.   5

x	60	75	90	105	120
f(x)	28.2	38.2	43.2	40.9	37.7

6. Using House-Holder's method, reduce the matrix

$$\begin{bmatrix} 1 & 4 & 3 \\ 4 & 1 & 2 \\ 3 & 2 & 1 \end{bmatrix}$$ to tri-diagonal form.   5

SECTION – IV

7. (a) Derive the formula for Trapezoidal rule.   2.5

    (b) Evaluate the integral $\int_{-1}^{1} \dfrac{dx}{1+x^2}$ using Gauss Quadrature formula for $n = 2$.   2.5

8. Given that $\dfrac{dy}{dx} = x + y^2$ and $y = 1$ at $x = 0$. Find an approximate value of y at $x = 0.5$ by Euler's modified method.   5

SECTION – V

9. (a) Prove that $\nabla = \Delta E^{-1}$. $1 \times 6 = 6$

    (b) Find the binomial distribution whose mean is 3 and variance is 2.

(3)   P. T. O.

    (c) State Simpson's one-third quadrature formula.

    (d) Define quarature.

    (e) Describe numerical integration.

    (f) Define interpolation and extrapolation.

(4)