PAPER ID-311271

Subject Code: BAS302

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM III) THEORY EXAMINATION 2023-24

MATHEMATICS-III

TIME: 3HRS **M.MARKS: 70**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

Q no.	Question	Marks	CO
a.	Solve the Partial differential equation $pq = 3p + 4q$	2	1
b.	Tell the classification of the following partial differential equation $4\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial^2 u}{\partial x \partial t} + 6\frac{\partial^2 u}{\partial t^2} = 0$	2	2
c.	State convolution theorem on Fourier transformation	2	2
d.	For a Binomial distribution, mean is 6 and variance is 4. Determine q.	2	3
e.	If Regression Coefficients are 0.5 and 0.5,what would be the value of coefficient of correlation?	2	3
f.	Find the missing value of the following table: x: 1 2 3 4 5 f(x): 7 - 13 21 37	2	4
g.	Write the formula of Trapezoidal rule.	2	5

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a.	Examine the partial differential equation $(D^2 - 2DD' + D'^2)z = cos(2y - 3x)$	7	1
b.	Determine the solution of one dimensional heat equation with the given conditions$u(0,t) = 0, u(l,t) = 0, u(x,0) = x$.	7	2
c.	From the following data, calculate the equations of line of regression of y on x and x on y. x: 6 2 10 4 8 y: 9 11 5 8 7	7	3
d.	Find a positive value of $(17)^{1/3}$ correct to four decimal places by Newton's Raphson method.	7	4
e.	Use fourth order Runge –Kutta method to find y(0.2) solving $\frac{dy}{dx} = 1 + y^2; y(0) = 0$	7	5

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

a.	Solve the Partial differential equation of$x^2\frac{\partial^2 z}{\partial x^2} - y^2\frac{\partial^2 z}{\partial y^2} = x^2y^2$	7	1
b.	By using Charpit's method to evaluate the solution of $px + qy = pq$	7	1

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4. Attempt any *one* part of the following: 7 x 1 = 7

a.	Determine Fourier Sine transform of the function $F(x)=\frac{e^{-ax}}{x}$, a>0.	7	2
b.	Solve the following partial differential equation by method of separation of variables: $\frac{\partial u}{\partial t}-\frac{\partial u}{\partial x}+2u=0.\ \ u(x,0)=10e^{-x}-6e^{-4x}$.	7	2

5. Attempt any *one* part of the following: 7 x 1 = 7

a.	Use the method of least squares to fit the curve y=a+bxfor the following data: x: 1, 2, 3, 4, 5 y: 12, 14, 15, 19, 22	7	3
b.	Compute skewness and Kurtosis,if the first four moments of a frequency distribution about the value 4 of the variable are 1,4,10 and 45.	7	3

6. Attempt any *one* part of the following: 7 x 1 = 7

a.	Find a real root of the following equations by the method of false position correct to four decimal places $x^3-5x+3=0$	7	4
b.	Using Newton's divided difference formula. Calculate the value of f(6) from the following data: x: 1, 4, 7, 9, 12 f(x): 10, 22, 32, 43, 56	7	4

7. Attempt any *one* part of the following: 7 x 1 = 7

a.	Solve the system of equations using gauss Seidel method. 2x+10y+z=51, 10x+y+2z=44, x+2y+10z=61.	7	5
b.	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using Simpson's one – third rule.	7	5