Sub Code:EBT101/NBT101A

Paper Id: 154111 Roll No: | | | | | | | | | | | | | |

B. TECH.
(SEM-I) THEORY EXAMINATION 2019-20
ELEMENTARY MATHEMATICS- I

Time: 3 Hours *Total Marks: 100*

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

SECTION A

1. Attempt *all* parts of this question in brief. 10 x 2 = 20

a) Evaluate $\lim_{x\to 2} \frac{x^2-5x+6}{x-4}$.
b) Differentiate log sin x^2
c) State Role's theorem.
d) Discuss the continuity of the function at x=2, f(x)=$\begin{cases} 2-x, & x<2 \\ 2+x, & x\geq 2 \end{cases}$
e) Evaluate $\int \tan^2 x \, dx$.
f) Evaluate $\int x e^x \, dx$.
g) Solve $x \frac{dy}{dx} + \cot y = 0$
h) Find the Particular integral of differential equation $y'+y = e^x$
i) Write Bernoulli's theorem.
j) Find the probability of getting head in a toss.

SECTION B

2. Attempt any *three* of the following: 3 x 10 = 30

a) Differentiate $\log_{10} x + \log_x 10 + \log_x x + \log_{10} 10$.
b) Verify LMVT for the function f(x) = x(x-2) on [1,3].
c) Evaluate $\int \sin(\log x)\, dx$.
d) Solve $x \frac{dy}{dx} + 2y = x^2 \log x$.
e) A card is drawn from a deck of 52 cards .Find the probability of getting a king or a heart or a red.

SECTION C

3. Attempt any *two* parts of the following: 2 x 5 = 10

a) If $y = \sqrt{\frac{1-x}{1+x}}$, find dy/dx.
b) The slope of the curve $2y^2 = ax^2+6$ at (1,-1) is -1.Find the value of a .
c) Find the derivative of $x^2 \sin x$ with respect to x.

4. Attempt any *two* parts of the following: 2 x 5 = 10

a) Show that f(x) = $|x|$ is not differentiable at x = 0.
b) If the radius of a sphere is measured as 9 cm with an error of 0.03cm then find the approximate error in calculating its volume.
c) Find the maximum and the minimum value of the function f(x) = x+sin2x ,$0 \leq x \leq 2\pi$

5. Attempt any *two* parts of the following: 2 x 5 = 10

a) Evaluate $\int e^x (\tan x + \log \sec x) dx$.
b) Evaluate $\int_2^4 \frac{x}{x^2+1} dx$.
c) Find the area of curve bounded by $y^2 = 4ax$ and y = x.

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6. Attempt any *two* parts of the following: 2 x 5 = 10

a) Solve $\frac{dy}{dx} = - x^2y^2$

b) Solve (x+y-10) dx + (x-y-2) dy = 0.

c) Solve $\frac{dy}{dx} = e^{x-y} + xe^{-y}$.

7. Attempt any *two* parts of the following: 2 x 5 = 10

a) A coin is tossed. If it shows head we draw a ball from a bag consisting of 3 red and 4 black balls, if it shows tails we throw a die. What is sample space associated to this experiment.

b) Find the probability of getting 2 heads and exactly one head in a simultaneous toss of two coins.

c) An urn contains 9 red ,7 white and 4 black balls .If two balls are drawn at random find the probability of one ball is white.