**Printed Pages: 02** **Sub Code: KBT201**

**Paper Id:** 900067 **Roll No.** | | | | | | | | | | |

**B TECH**

**(SEM-II) THEORY EXAMINATION, 2018-19**

**ELEMANTARY MATHEMATICS-II**

***Time: 3 Hours*** ***Total Marks: 100***

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

## SECTION-A

**1. Attempt all questions in brief.** **10× 2=20**

(a) Write the fundamental theorem of calculus.

(b) Evaluate $\int_{-\pi/2}^{\pi/2} sin^7 x\, dx$

(c) Define order and degree of a Differential Equation.

(d) The order of a Differential Equation $y''' + 2y'' + 3y' = 0$

(e) Find the vector joining the points $P(2,3,0)$ and $(-1,5,7)$ directed from $P$ to $Q$.

(f) Find a vector in the direction of vector $\vec{a} = \hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ that has magnitude 7 units

(g) Define Skew Lines.

(h) Find the direction cosines of a line, if it's direction ratios are (2,-1,-2)

(i) Define probability

(j) Given P(A)=3/5 and P(B)=1/5.Find P(A or B),if A and B are mutually exclusive events.

## SECTION B

**2. Attempt any THREE parts of the following.** **10× 3=30**

(a) Find $\int x(logx)\, dx$

(b) Verify that the given function is a solution of the corresponding Differential Equation.

$y = \sqrt{1 + x^2}$ :$y' = \frac{xy}{1+x^2}$

(c) If$\vec{a} = 2\hat{\imath} + 2\hat{\jmath} + 3\hat{k}$, $\vec{b} = -\hat{\imath} + 2\hat{\jmath} + \hat{k}$ and $\vec{c} = 3\hat{\imath} + \hat{\jmath}$ are such that $\vec{a} + \lambda\vec{b}$ is perpendicular to $\vec{c}$ then find the value of $\lambda$.

(d) Find the Cartesian equation of a line which passes through the point (-2,4,-5)and parallel to the line given by $\frac{x+3}{3} = \frac{y-4}{5} = \frac{Z+8}{6}$

(e) One card is drawn from a well shuffled deck of 52 cards. If each outcome is equally likely, calculate the probability that the card will be:

(i) a diamond (ii)not an ace (iii)a black card (iv)not a diamond

## SECTION C

**3. Attempt any ONE part of the following.** **10× 1=10**

(a) Evaluate the integrals as limit of sum $\int_2^3 x^2\,dx$

(b) Evaluate the integral using properties of Definite integral $\int_{-5}^{5}|x+2|\,dx$

**4. Attempt any ONE part of the following.** **10× 1=10**

(a)Solve the differential equation $\frac{dy}{dx}=\frac{1-cosx}{1+cosx}$

(b) Solve the differential equation $\frac{dy}{dx}-3ycotx=\sin 2x\ \ y\left(\frac{\pi}{2}\right)=2$

**5. Attempt any ONE part of the following.** **10× 1=10**

(a) If $\vec{a}$ is a unit vector and $(\vec{x}-\vec{a}).(\vec{x}+\vec{a})$=8,then find $|\vec{x}|$.

(b) Find the area of a parallelogram whose adjacent sides are given by the vectors $\vec{a}=\hat{\imath}-\hat{\jmath}+3\hat{k}$ and $\vec{b}=2\hat{\imath}-7\hat{\jmath}+\hat{k}$.

**6. Attempt any ONE part of the following.** **10× 1=10**

(a) Find the shortest distance between the lines $\frac{x-1}{1}=\frac{y-2}{-3}=\frac{z-3}{2}$

and $\frac{x-4}{2}=\frac{y-5}{3}=\frac{z-6}{1}$

(b) Find the angle between the two planes $3x-6y+2z=7\ \ and\ 2x+2y-2z=5$

**7. Attempt any ONE part of the following.** **10× 1=10**

(a) Write the addition theorem of probability**.** A card is drawn at random from a pack of 52 cards. Find the probability that the drawn card is either a spade or a king.

(b)A doctor is to visit a patient .From the past experience it is known that the probabilities that he will come by train, bus, scooter or by other means of transport are respectively 3/10,1/5,1/10, and 2/5.The probabilities that he will be late are ¼,1/3, and 1/12,if he comes by train, bus and scooter respectively, but if comes by other means of transport, then he will not be late .When he arrives ,he is late. What is the probability that he comes by train?