KENDRIYA VIDYALAYA BHU

MONTHLY TEST(SEP) EXAM – 2024-25

CLASS – XII

SUBJECT: MATHEMATICS

Time:Hrs **Max. Marks: 40**

General Instructions:

1. All questions are compulsory.
2. This question paper consists of 17 questions divided into four sections A, B, C and D. Section A comprises of 5 questions of one mark each, section B comprises of 5 questions of two marks each , section C comprises of 5 questions of three marks each, section D comprises of 2 questions of five marks each
3. Use of calculators is not permitted. You may ask for logarithmic tables, if required.

SECTION : A

1 If the rate of change of area of circle is equal to the rate of change of its diameter, then its radius is equal to……..

2 The function f(x)=x^x *decrease on the interval*

a. (0,e) b.(0,1) c.(0,1/e) d.(1/e,e)

3 Find the integral of $\int_0^{\pi} \frac{1}{a+bcosx} dx$

4 Find the value of $\int_0^{2\pi} \sqrt{1+sin\frac{x}{2}}$ dx

5 $\int (x-1)e^{-x} dx$.

SECTION:B

6 Find the intervals in which the function f given by f(x)=$2x^2-3x$ is (i) strictly increasing (ii) strictly decreasing

7 A stone is dropped into a quiet lake and waves move in circles at a speed of 4 cm per second. At the instant, when the radius of the circular wave is 10 cm, how fast is the enclosed area increasing?

8 Find two positive numbers whose sum is 16 and the sum of whose cubes is minimum.

9 Find the integral $\int \frac{x}{(x-1)(x-2)} dx$.

10 Find the integral $\int \frac{2cos2x-1}{1+2sinx} dx$.

SECTION :C

11 Evaluate : Evaluate: $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{tanx}}$

12 **Evaluate** $\int_0^{\pi/4} \log(1+\tan x)\,dx$.

13 Evaluate the integrals $\int \frac{x+3}{\sqrt{5-4x-x^2}}dx$

14 Find the intervals in which the given function is strictly increasing or decreasing f(x) = $-2x^3 - 9x^2 - 12x + 1$

15 Show that of all the rectangles inscribed in a given fixed circle , the square has maximum area.

SECTION :D

16 *Elaluate* : $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx$

17 Using integration , find the area bounded by the ellipse $9x^2 + 25y^2 = 225$ the lines x=-2 , x=2 , and x-axis.