Delhi Public School, Jammu

Assignment For Half Yearly Examination 2017-18

Class- XII

Sub: Mathematics

SECTION –A

Q1.If $\begin{vmatrix} 2x & x+3 \\ 2(x+1) & x+1 \end{vmatrix} = \begin{vmatrix} 1 & 5 \\ 3 & 3 \end{vmatrix}$ then write the value of x.

Q2.Check the continuity of the function f(x)=$\begin{cases} \frac{|x|}{x} \text{ if } x\neq 0 \\ 0, \text{if } x=0 \end{cases}$

Q3.Integrate $\left(\frac{a}{\sqrt{x}} + 2b\sqrt[3]{x^2}\right)$ w.r.t x.

Q4.Let f:R→R be defined by f(x)=$3x^2$-5 and g:R→R be defined by g(x)=$\frac{x}{x^2+1}$.Find fog.

SECTION-B

Q5.Show that the function f(x)= tanx-x is always increasing in xεR

Q6. Differentiate log(1+x)with respect to $\sin^{-1}\theta$

Q7.$Evaluate\ \int_e^{e^2} \frac{1}{x\ logx} dx$

Q8.For what value of c, Mean value theorem is applicable for the function f(x)=x +$\frac{1}{x}$ on [1,3]

Q9.Find $\frac{dy}{dx}$,if y = $\tan^{-1}\left(\frac{1-cosx}{1+\cos x}\right)$

Q1O.Using derivative ,find the approximate percentage increase in the area of a circle if its radius is increased by 2%.

Q11.Evaluate$\int xe^{x^2} dx$

Q12.Find the points on the curve y=x^3at which the slope of the tangent is equal to y-coordinate of the Point.

SECTION-C

Q13.Prove that $2\tan^{-1}\left(\frac{1}{2}\right)+ \tan^{-1}\frac{1}{7} = \sin^{-1}\left(\frac{31}{25\sqrt{2}}\right)$

Q14.If y= $(\sin x)^x + \sin^{-1}\sqrt{x}$, find dy/dx.

Q15.Evaluate$\int_2^5 (3x^2 - 5) dx$ as limit of sums.

Q16.Solve the differential equation $\cos^2 x \frac{dy}{dx}$ + y = tanx

Q17.If F(x)=$\begin{pmatrix} cosx & x & 1 \\ 2sinx & x & 2x \\ sinx & x & x \end{pmatrix}$,then find $\lim_{x\to 0}\frac{F(x)}{x^2}$

Q18.The function f(x) is defined as f(x) = $\begin{Bmatrix} x^2+ax+b, 0\le x<2 \\ 3x+2, 2\le x\le 4 \\ 2ax+5b, 4<x\le 8 \end{Bmatrix}$.If f(x) is continuous in[0,8],Find the values of a and b.

Q19.Prove using properties of determinant $\begin{vmatrix} a+bx^2 & c+dx^2 & p+qx^2 \\ ax^2+b & cx^2+d & px^2+q \\ u & v & w \end{vmatrix}$=$(x^4-1)\begin{vmatrix} b & d & q \\ a & c & p \\ u & v & w \end{vmatrix}$

Q20.Evaluate$\int x-3\sqrt{x^2+3x-18}dx$.

Q21.Form the differential equation of the family of circles in the first quadrant which touches the coordinate axes.

Q22.Let f:N→ $N\ such\ that$ f(x)=$\begin{Bmatrix} \frac{n+1}{2}, if\ n\ is\ odd \\ \frac{n}{2}, if\ n\ is\ even \end{Bmatrix}$for all nεN.State whether the function is bijective or Not.

Q23.Prove that $\cot^{-1}[2\tan(\cos^{-1}\frac{8}{17})] + \tan^{-1}[2\tan(\sin^{-1}\frac{8}{17})]= \tan^{-1}(\frac{300}{161})$

SECTION-D

Q24.If A =$\begin{pmatrix} 1 & -1 & 1 \\ 2 & 1 & -3 \\ 1 & 1 & 1 \end{pmatrix}$.find A^{-1} and hence solve the system of equqtions. X+2y+z=4,-x+y+z=0, x-3y+z=2.

Q25.Let x be a non empty set. P(x)be its power set.Let * be an operation defined on elements of P(x) by, A*B=A∩B,for all A,B εP(x). Then

i)Is * commutative? Ii)Is * associative iii)Find the identity element in P(x) w.r.t * iv)Prove that * is a binary operation in P(x) v)Find all the invertible elements of P(x) .

Q26.An open box with square base is to be made out of a given quantity of sheet of area a^2sq. units.Show that the maximum volume of the box is$\frac{a3}{6\sqrt{3}}$

Q27.Evaluate $\int_{\pi/6}^{\pi/3}\frac{1}{\sqrt{1+tanx}}dx$

Q28.Solve the differential equation:$\frac{dy}{dx}$ =$\frac{(2y-x)}{2y+x}$,if y=1 when x=1

Q29.Let f:N→S be a function defined as f(x) = $4x^2+12x+15$.Show that f: N→S where S is the range of f,is invertible. Also find the inverse of f. Hence find $f^{-1}(31)$.