INDIAN SCHOOL AL WADI AL KABIR

Holiday Assignment (2019-20)

Class: XII | Sub: MATHEMATICS | Submission Date

Date : 23-05-2019 | 8th Aug 2019

Instructions:

(i) ***All*** *questions are compulsory*

(ii) *Please write down the serial number of the question before attempting it.*

Section A : Multiple Choice Question

Q.1. The value of $\tan\left(\cos^{-1}\left(\frac{1}{\sqrt{2}}\right)\right)$.

A $\sqrt{3}$ **B** 0 **C** 1 **D** $\frac{1}{\sqrt{3}}$

Q.2. The value of $\int_{-\pi/2}^{\pi/2}(x^3 + xcosx + tan^5x + 1)dx$

A $\frac{\pi}{2}$ **B** π **C** 2π **D** $-\pi$

Q.3. If $x \in N$ and $\begin{vmatrix} x+3 & -2 \\ -3x & 2x \end{vmatrix} = 8$,then the value of x is

A $x = 1$ **B** $x = 2$ **C** $x = 3$ **D** $x = 4$

Section A : Match the following

	Column A		**Column B**
Q.4.	The simplest form of $cot^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right), \lvert x\rvert > 1$	(i)	24
Q.5.	Let A = {1, 2, 3}. Then, the number of relations containing (1, 2) and (1, 3) which are reflexive and symmetric but not transitive is	(ii)	$sec^{-1}x$
Q.6.	The total number of injective mappings from the set containing 3 elements into the set containing 4 elements is	(iii)	1

Section B : Short Answer Questions (Type – 1)

Q.7. Find $\int \frac{(x^2+\sin^2 x)\sec^2 x}{1+x^2}\,dx$

Q.8. Evaluate: $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \log\left|\frac{2-\sin x}{2+\sin x}\right| dx$.

Q.9. If $2\begin{bmatrix}1 & 3\\ 0 & x\end{bmatrix}+\begin{bmatrix}y & 0\\ 1 & 2\end{bmatrix}=\begin{bmatrix}5 & 6\\ 1 & 8\end{bmatrix}$ then find the value of $x+y$.

Q.10. Determine the value of 'k' for which the following function is continuous at x = 3 :

$$f(x)=\begin{cases}\dfrac{(x+3)^2-36}{x-3} & ,x\neq 3\\ k & ,x=3\end{cases}$$

Q.11. Use elementary Row operation $R_2 \to R_2 - R_1$ and then apply $C_2 \to C_2 - C_1$ in the matrix equation $\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}\begin{bmatrix}4 & 3\\ 2 & 1\end{bmatrix}=\begin{bmatrix}8 & 5\\ 20 & 13\end{bmatrix}$

Q.12. Show that $\cos[\tan^{-1}\{\sin(\cot^{-1}x)\}]=\sqrt{\frac{1+x^2}{2+x^2}}$.

Section C : Long Answer Questions (Type – 1)

Q.13. If $y=\cot^{-1}\left(\sqrt{\cos x}\right)-\tan^{-1}\left(\sqrt{\cos x}\right)$,then prove that $\sin y=\tan^2\left(\frac{x}{2}\right)$

Q.14. Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1+\sqrt{\tan x}}$

Q.15. If $(a+bx)e^{\frac{y}{x}}=x$ then prove that $x^3\dfrac{d^2y}{dx^2}=\left(x\dfrac{dy}{dx}-y\right)^2$.

Q.16. Find $\int \frac{\sin x}{(\cos^2 x+1)(\cos^2 x+4)}\,dx$

Q.17. Evaluate $\int_2^8 \frac{\sqrt[3]{x+1}}{\sqrt[3]{x+1}+\sqrt[3]{11-x}}\,dx$

Q.18. If $\tan^{-1}\left(\dfrac{\sqrt{1+x^2}-\sqrt{1-x^2}}{\sqrt{1+x^2}+\sqrt{1-x^2}}\right)=\alpha$ then prove that $x^2=\sin^2\alpha$

Section D : Long Answer Questions (Type – 2)

Q.19. A relation R in the set of real numbers is defined as xRy if and only if x-y $+\sqrt{2}$ is an irrational number.Find if R is (i) Reflexive (ii) Symmetric (iii) Transitive.

Q.20 Evaluate $\int_0^{\frac{\pi}{2}} \frac{dx}{a^2cos^2x+b^2sin^2x}$

Q.21 Evaluate $\int_0^{\frac{\pi}{4}} \frac{x\ Sin\ x\ Cos\ x}{Cos^4x+Sin^4x}\ dx$

Q.22. If $x = sint\ , y = sinpt$, prove that $(1-x^2)\frac{d^2y}{dx^2} - x\frac{dy}{dx} + p^2y = 0$

Q.23. Find $\int_0^2 (x^2 + x)dx$ as the limit of a sum.

Q.24. Find the inverse of the following matrix using elementary transformations.

$$\begin{bmatrix} 1 & -1 & 0 \\ 2 & 5 & 3 \\ 0 & 2 & 1 \end{bmatrix}$$

Q.25. By using elementary operations find the inverse of the matrix $A = \begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -5 \\ 2 & 5 & 0 \end{bmatrix}$

Answers: **1.** C **2.** B **3.** B **4.** $sec^{-1}x$ **5.** 1

6. 24

7. $tanx - tan^{-1}x + C$ **8.** 0 **9.** 6 **10.** $k = 12$

11. $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}\begin{bmatrix} 4 & -1 \\ 2 & -1 \end{bmatrix} = \begin{bmatrix} 8 & -3 \\ 12 & -4 \end{bmatrix}$ **14.** $\frac{\pi}{12}$

16. $\frac{-1}{3}tan^{-1}(cosx) + \frac{1}{6}tan^{-1}\left(\frac{cosx}{2}\right) + C$ **17.** 3 **20.** $\frac{\pi}{2ab}$ **21.** $\frac{\pi}{8}$

23. $\frac{14}{3}$ **24.** $\begin{bmatrix} -1 & 1 & -3 \\ -2 & 1 & -3 \\ 4 & -2 & 7 \end{bmatrix}$ **25.** $\frac{1}{25}\begin{bmatrix} 25 & -10 & -15 \\ -10 & 4 & 11 \\ -15 & 1 & 9 \end{bmatrix}$