INDIAN SCHOOL MUSCAT

SECOND PERIODIC TEST

MATHEMATICS

CLASS: XII   Sub.Code:041   Time Allotted: 50mts.

22 .05.2023

Max .Marks: 20

GENERAL INSTRUCTIONS:

1. This Question paper contains four sections A, B, C and D. Each section is compulsory.

2. Section A has 3 MCQ's and 1 Assertion-Reasoning question of 1 mark each.

3. Section B has 3 very short answer (VSA) type questions of 2 marks each.

4. Section C has 2 short answer (SA) type questions of 3 marks each.

5.Section D has 1 Sourced based / Case based Question carrying 4 marks

SECTION : A

1. The value of $sin^{-1}\left(sin\frac{3\pi}{5}\right)$ is

   (a) $\frac{3\pi}{5}$ (b) $\frac{-\pi}{2}$ (c) $\frac{\pi}{2}$ (d) $\frac{2\pi}{5}$

2. One branch of $cos^{-1}x$ other than principal value branch corresponds to

   (a) $\left[\frac{\pi}{2},\frac{3\pi}{2}\right]$ (b) $[\pi, 2\pi] - \left\{\frac{3\pi}{2}\right\}$ (c) $(0,\pi)$ (d)) $[2\pi, 3\pi]$

3. The value of the expression $2sec^{-1}(2) + sin^{-1}\left(\frac{1}{2}\right) + 3sin^{-1}(0)$ is

   (a) $\frac{5\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$

4. Assertion (A) : $\Delta = a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$, where A_{ij} is cofactor of a_{ij}

   Reason (R) : Δ = Sum of the products of elements of any row(or column) with their corresponding cofactors.

   (a) Both (A) and (R) are true and (R) is the correct explanation of (A)
   (b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false
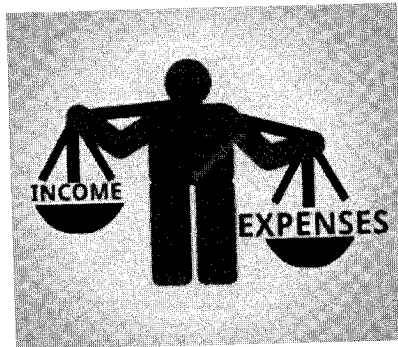
(d) (A) is false but (R) is true

SECTION : B

5. Draw the principal value branch of the function $y = tan^{-1}x$. Also write the range of the function.

6. Find the domain of $cos^{-1}(2x - 1)$.

7. If $A = \begin{bmatrix} p & 2 \\ 2 & p \end{bmatrix}$ and $|A^3| = 125$, then find the value of p.

SECTION : C

8. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I = 0$. Hence find A^{-1}.

9. If $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$, then verify that $A\ adj(A) = |A|I$.

SECTION : D

10. The monthly income of two brothers Joel and Jeevan are in the ratio 3:4 and the monthly expenditures are in the ratio 5:7 respectively. Each brother saves ₹ 15,000 per month. Read the above instruction and answer the following questions.

(i)   Write the system of linear equations for the above problem.

(ii)   Write the matrix equation for the question.

(iii)   If $A = \begin{bmatrix} 3 & -5 \\ 4 & -7 \end{bmatrix}$, then find A^{-1}.

OR

(iii)   Find the monthly income of Joel and Jeevan using matrix method.

INDIAN SCHOOL MUSCAT

SECOND PERIODIC TEST

MATHEMATICS

CLASS: XII   Sub.Code: 041   Time Allotted: 50mts.

22.05.2023   Max .Marks: 20

GENERAL INSTRUCTIONS:

*1.This Question paper contains **four sections A,B,C** and **D**. Each section is compulsory.*

2.Section A has 3 MCQ's and 1 Assertion-Reasoning question of 1 mark each.

3.Section B has 3 very short answer (VSA) type questions of 2 marks each.

4.Section C has 2 short answer (SA) type questions of 3 marks each.

5.Section D has 1 Sourced based / Case based Question carrying 4 marks

SECTION :A

1. The value of $cos^{-1}\left(cos\frac{13\pi}{6}\right)$ is

    (a) $\frac{13\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$

2. The value of the expression $2sec^{-1}(2) + sin^{-1}\left(\frac{1}{2}\right) + 2sin^{-1}(0)$ is

    (a) $\frac{5\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$

3. One branch of $sin^{-1}x$ other than principal value branch corresponds to

    (a) $\left[\frac{\pi}{2},\frac{3\pi}{2}\right]$ (b) $[\pi,\ 2\pi] - \left\{\frac{3\pi}{2}\right\}$ (c) $(0,\pi)$ (d)) $[\ 2\pi,\ 3\pi\ ]$

4. Assertion (A) : $\Delta = a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$, where A_{ij} is cofactor of a_{ij}

    Reason (R) : Δ = Sum of the products of elements of any row(or column) with their corresponding cofactors.

    (a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

SECTION :B

5. Find the domain of $sin^{-1}(2x - 1)$.

6. Draw the principal value branch of the function $y = cot^{-1}x$. Also write the range of the function.

7. If $A = \begin{bmatrix} a & 3 \\ 1 & a \end{bmatrix}$ and $|A^3| = 216$, then find the value of a.

SECTION : C

8. If A $= \begin{bmatrix} 2 & -3 \\ 3 & 4 \end{bmatrix}$, show that $A^2 - 6A + 17I = 0$. Hence find A^{-1}.

9. If A$= \begin{bmatrix} 1 & -1 & 2 \\ 2 & 3 & 5 \\ -2 & 0 & 1 \end{bmatrix}$, then verify that $A\ adj(A) = |A|I$.

SECTION : D

10. The monthly income of two brothers Joel and Jeevan are in the ratio 3:4 and the monthly expenditures are in the ratio 5:7 respectively. Each brother saves ₹ 15,000 per month. Read the above instruction and answer the following questions.

   (i)   Write the system of linear equations for the above problem.

   (ii) Write the matrix equation for the question.

   (iii) If A= $\begin{bmatrix} 3 & -5 \\ 4 & -7 \end{bmatrix}$, then find A^{-1}.

OR

   (iii) Find the monthly income of Joel and Jeevan using matrix method.

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*4.Section C has 2 **short answer (SA)** type questions of 3 marks each.*

*5.Section D has 1 **Sourced based / Case based Question** carrying 4 marks*

SECTION :A

1. The value of $tan^{-1}\left(tan\frac{3\pi}{4}\right)$ is

    (a) $\frac{3\pi}{4}$ (b) $\frac{-\pi}{2}$ (c) $\frac{\pi}{4}$ (d) $\frac{-\pi}{4}$

2. The value of the expression $2cos^{-1}\left(\frac{1}{2}\right) + cosec^{-1}(2) + 3sin^{-1}(0)$ is

    (a) $\frac{5\pi}{6}$ (b) $\frac{-\pi}{6}$ (c) $\frac{\pi}{6}$ (d) $\frac{7\pi}{6}$

3. One branch of $cos^{-1}x$ other than principal value branch corresponds to

    $\left[\frac{\pi}{2},\frac{3\pi}{2}\right]$ (b) $[\pi, 2\pi] - \left\{\frac{3\pi}{2}\right\}$ (c) $(0,\pi)$ (d)) $[2\pi, 3\pi]$

4. Assertion (A) : $\Delta = a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13}$, where A_{ij} is cofactor of a_{ij}

    Reason (R) : Δ = Sum of the products of elements of any row(or column) with their corresponding cofactors.

    (a) Both (A) and (R) are true and (R) is the correct explanation of (A)

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false

(d) (A) is false but (R) is true

SECTION : B

5. Find the domain of $cos^{-1}(3x - 1)$.

6. If $A = \begin{bmatrix} a & 4 \\ 5 & a \end{bmatrix}$ and $|A^3| = 125$,then find the value of a.

7. Draw the principal value branch of the function $y = tan^{-1}x$. Also write the range of the function.

SECTION : C

8. If $A = \begin{bmatrix} 5 & 3 \\ -1 & -2 \end{bmatrix}$, show that $A^2 - 3A - 7I = O$. Hence find A^{-1}.

9. If $A = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$, then verify that $A \, adj(A) = |A|I$.

SECTION : D

10. The monthly income of two brothers Joel and Jeevan are in the ratio 3:4 and the monthly expenditures are in the ratio 5:7 respectively. Each brother saves ₹ 15,000 per month. Read the above instruction and answer the following questions.

(i) Write the system of linear equations for the above problem.

(ii) Write the matrix equation for the question.

(iii) If $A = \begin{bmatrix} 3 & -5 \\ 4 & -7 \end{bmatrix}$, then find A^{-1}.

OR

(iii) Find the monthly income of Joel and Jeevan using matrix method.