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PRE BOARD EXAMINATION (2022-23)

CLASS XII

SUBJECT: MATHEMATICS (041)								
TIME: 3 HR	S.		MM: 80					
1. This paper of However, then 2. Section A coordinate of the Control of the Cont	re are internal choicontains 18 MCQs and the contains 5 VSA type contains 6 SA type contains 4 Long Ar	ces in some que and two questions be questions of TI questions of TI nswer type ques	ns assertion –Reason based questions of					
		SECTI						
	[]	Each question of	carries 1 mark]					
1.If $ 2x - 14 $	2 = 3 0 2 1 then x	is						
(a) 3	(b) 2/3	(c) 3/2	(d) -1/4					
2.If a matrix ha	s 8 elements ,then n	umber of possible	e orders of the matrix can be					
(a) 4	(b) 6	(c) 2	(d) none of these					
$3. \int e^x dx$ is								
(a) 4x ³	(b) $1/5 x^5$	(c) e^x	(d) none of these					
4. Given a squa	re matrix A of order	3x3 ,such that IA	I = 6, then the value of $ A.adjA $ is					
(a) 36	(b) 216	(c) 96	(d) none of these					
5.Integrating fa	ctor for the solution	of differential eq	uation $\frac{dy}{dx}$ +2y tan x = sin x is					
(a) sec ² x	(b) sec x	(c) tan x	(d) log I sec xI					
6.The domain o	of the function $\sin^{-1\sqrt{\chi}}$	⁻¹ is						
(a).[-1,1]	(b) [0,1]	(c) [1,2]	(d) none of these					
7.Let $A = \{a,b\}$.	Then number of one	- one functions fr	om A to A possible are					

(b) 4 (c) 1

8.If $|\vec{a}| = 8$, $|\vec{b}| = 3$ and $|\vec{a}.\vec{b}| = 12\sqrt{3}$ then the value of $|\vec{a}X\vec{b}|$ is

(b) $12\sqrt{3}$

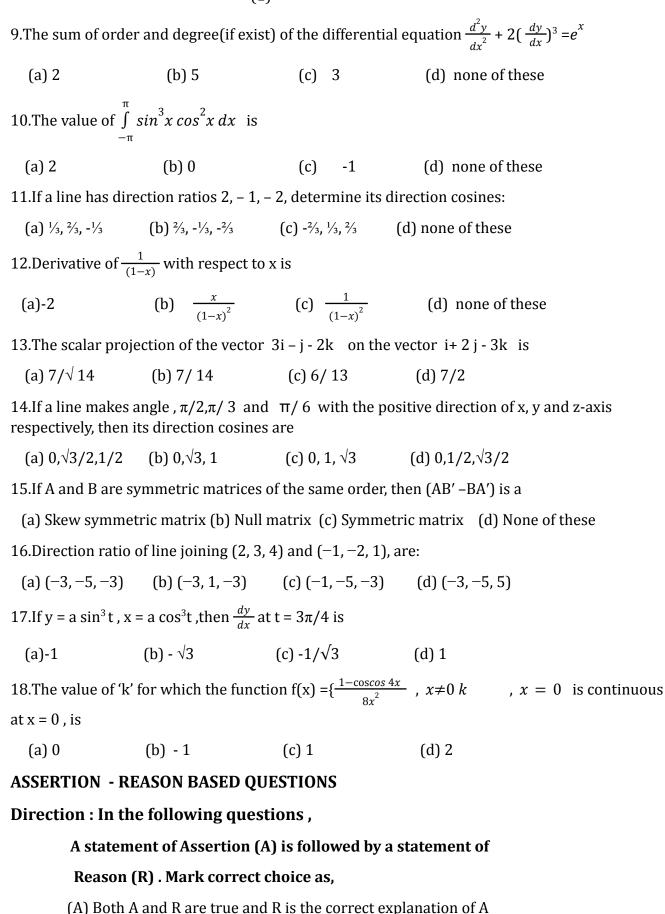
(c) 6

(d) 3

(d) none of these

(a) 2

(a) 12



(B) Both A and R are true, R is not correct explanation of A

(C) A is true but R is false.

(D) A is false but R is true.

19.Let W be the set of words in the English dictionary. A relation R is defined on W as

 $R = \{(x,y) \in W \times W \text{ such that } x \text{ and } y \text{ have at least one letter in common.} \}$

Assertion (A): R is reflexive.

Reason (R): R is symmetric.

(a) A

(b) B

(c) C

(d) D

20.Consider the function f:R \rightarrow R defined as f(x)= x^3

Assertion (A): f(x) is a one -one function.

Reason (R): f(x) is a one -one function if co-domain = range.

(a) A

(b) B

(c) C

(d) D

SECTION - B

[Each question carries 2 mark]

21.If A = $[3 \ 1 \ - \ 1 \ 2]$ Show that $A^2 - 5A + 7I = 0$. Hence find A^{-1}

OR

Find the value of k if the area of triangle with vertices (k,0), (4,0) and (0,2) is 4 square units.

22. Find the Vector equation of the line which passes through the point (-2,4,-5) and is parallel to the line $\frac{x+3}{2} = \frac{2-y}{5} = \frac{2z+3}{6}$

OR

Find the value of λ if $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are orthogonal given that $\vec{a} = \hat{i} - \hat{j} + 7\hat{k}$ and $\vec{b} = 5$ $\hat{i} - \hat{j} + \lambda \hat{k}$

23.Evaluate:
$$\int \frac{dx}{x^2 + 3x + 2}$$

24.If the rate of change of volume of a sphere is equal to the rate of change of its radius, Then find the radius.

25. If x = a sect, y = b tant, then find $\frac{d^2y}{dx^2}$ at t = $\frac{\pi}{6}$

OR

If
$$x^y = y^x$$
, then $\frac{dy}{dx}$

SECTION – C [Each question carries 3 mark]

Find the particular solution of the differential equation e^x tan $y dy + (2 - e^x)$

26. Find the particular solution of the differential equation $e^x \tan y \, dx + (2 - e^x) \sec^2 y \, dy = 0$, given that $y = \pi/4$ when x = 0.

Find the particular solution of the differential equation $2x^{2\frac{dy}{dx}}$ - $2xy + y^2 = 0$; y(e) = e

(3)

27. Find the value of x

If
$$[1 \times 1][1 \ 3 \ 2 \ 2 \ 5 \ 1 \ 15 \ 3 \ 2][1 \ 2 \times] = 0$$

28. Find the value of λ , so that the lines $\frac{1-x}{3} = \frac{7y-14}{2\lambda} = \frac{5z-10}{11}$ and $\frac{7-7x}{3\lambda} = \frac{y-5}{1} = \frac{6-z}{5}$ are perpendicular to each other.

29. Find the intervals at which the function $f(x)=2x^3-3x^2-36x+7$ is strictly increasing or strictly decreasing.

OR

Evaluate:
$$\int_{-1}^{2} |x^3 - x| dx$$

30.Let Z be the set of all integers and R be the relation on Z defined as $R = \{ (a, b) : a, b \in Z \text{ and } (a - b) \text{ is divisible by 5 } \}.$ Prove that R is an equivalence relation

31.If $\vec{\alpha} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{\beta} = 2\hat{i} + \hat{j} - 4\hat{k}$, Then express $\vec{\beta}$ in the form $\vec{\beta} = \vec{\beta_1} + \vec{\beta_2}$, Where $\vec{\beta_1}$ is parallel to $\vec{\alpha}$ and $\vec{\beta_2}$ is perpendicular to $\vec{\alpha}$.

SECTION – D [Each question carries 5 mark]

32.Determine the product $[-\ 4\ 4\ 4\ -\ 7\ 1\ 3\ 5\ -\ 3\ -\ 1\][1\ -\ 1\ 1\ 1\ -\ 2\ -\ 2\ 2\ 1\ 3\]$ and use it to solve the system of equations

$$x-y+z=4$$

$$x-2y-2z=9$$

$$2x+y+3z=1$$

33. Find the shortest distance between the following lines:

$$\vec{r} = (1 + \lambda)\hat{i} + (2 - \lambda)\hat{j} + (\lambda + 1)\hat{k}$$

$$\vec{r} = (2\hat{i} - \hat{j} - \hat{k}) + \mu(2\hat{i} + \hat{j} + 2\hat{k})$$

OR

Show that the two lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-4}{5} = \frac{y-1}{2} = z$ are intersecting each other. Find the point of intersection of these lines. Also find the distance between (-1,2,3) and point of intersection of given lines

34. Find the area of the region bounded by the curve $x^2 = 4y$ and the line 4y = x + 2

35.Evaluate:
$$\int_{0}^{\pi/2} log \sin x \, dx$$

Evaluate: $\int (\sqrt{\cot x} + \sqrt{\tan x}) dx$

(4)

SECTION - E

[Each question carries 4 mark]

36. Three schools DPS, CVC and KVS decided to organize a fair for collecting money for helping the flood victims. They sold handmade fans, mats and plates from recycled material at a cost of Rs. 25, Rs. 100 and Rs. 50 each respectively. The numbers of articles sold are given as







School /Article	DPS	CVC	KVS
Handmade fans	40	25	35
Mats	50	40	50
Plates	20	30	40

Based on the information given above, answer the following questions by using matrix:

- 1. What is the total money (in Rupees) collected by the school DPS?
- a. 700
- b. 7,000
- c. 6;125
- d. 7875
- 2. What is the total amount of money (in Rs.) collected by schools CVC and KVS?
- a. 14,000
- b. 15,725
- c. 21,000
- d. 13,125
- 3. What is the total amount of money collected by all three schools DPS, CVC and KVS?
- a. Rs. 15,775
- b. Rs. 14,000
- c. Rs. 21,000
- d. Rs. 17,125

