CODE:- AG-7-3689 **REG.NO:-TMC -D/79/89/36**

General Instructions :

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5. Use of calculator is not permitted.
6. Please check that this question paper contains 3 printed pages.
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सामान्य निर्देश :

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7. प्रश्न–पत्र में दाहिने हाथ की ओर दिए गए कोड नम

Pre-Board Examination 2010 -11

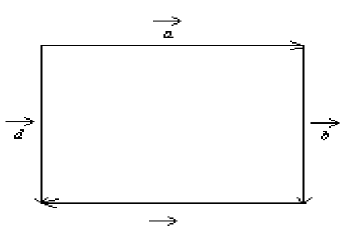
Time : 3 Hours	अधिकतम समय : 3
Maximum Marks : 100	अधिकतम अंक : 100
Total No. Of Pages :3	कुल पृष्ठों की संख्या : 3

CLASS – XII CBSE MATHEMATICS

Section A

Q.1 Find the value of $\tan^{-1}\left(\sqrt{3}\right) - \sec^{-1}(-2)$.

Q.2 In figure (a square), identify the following vectors.(i) Coinitial (ii) Equal (iii)Collinear but not equal



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Q.3	Find the slope of the tangent to the curve $x = t^2 + 3t - 8, y = 2t^2 - 2t - 5$ at the point.(2, -1)
Q.4	If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}, \vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j}$ are such that $\vec{a} + \lambda\vec{b}$ is perpendicular to $\vec{c}$, then find the value of λ.
Q.5	If f : R $\rightarrow$ R be defined as f(x) = $\frac{3x+7}{9}$, then find $f^{-1}(x)$.
Q.6	Let relation $R = \{(x, y) \in w \times w : y = 2x - 4\}$. If (a , - 2) and $(4, b^2)$ belong to relation R, find the value of a and b .
Q.7	Find values of k if area of triangle is 4 square units and vertices are (k,0),(4,0),(0,2).
Q.8	The number of all possible matrices of order 3×3 with each entry 0 or 1 .
Q.9	Find the total number of one one function from set A to A if A = {1 , 2 , 3 , 4 } .
Q.10	If the points (1, 1, p) and (-3, 0, 1) be equidistant from the plane $\vec{r}.(3\hat{i} + 4\hat{j} - 12\hat{k}) + 13 = 0,$ then find the value of p.
	Section B
Q.11	Show that the curve $y^2 = 8x$ & $2x^2 + y^2 = 10$ intersect orthogonally at the point $(1, 2\sqrt{2})$.
Q.12	If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of the vertices A, B, C of a ΔABC respectively. Find an expression for the area of ΔABC and hence deduce the condition for the points A, B, C to be collinear.
Q.13	Evaluate: $\int e^x Sin^2 4x dx$. OR Evaluate : $\int e^x \left(\frac{x^2+1}{(x+1)^2}\right) dx$.
Q.14	Find all point of discontinuity of f , where f is defined as following : $f(x) = \begin{cases} \lvert x\rvert + 3 & if x \le -3 \\ -2x & -3 < x < 3 \\ 6x + 2 & if x \ge 3 \end{cases}$.
Q.15	Show that the following differential equation is homogeneous, and then solve it : $ydx + x\log\left(\frac{y}{x}\right)dy - 2xdy = 0$.
Q.16	The volume of spherical balloon being inflated changes at a constant rate. If initially its radius is 3 units and after 3 seconds it is 6 units. Find the radius of balloon after t seconds. **OR** Find the particular solution of the differential equation $\frac{dy}{dx} + y\cot x = 2x + x^2 \cot x (x \neq 0)$ given that y = 0 when $x = \frac{\pi}{2}$.
Q.17	Prove the following : $\cos[\tan^{-1}\{\sin(\cot^{-1} x)\}] = \sqrt{\frac{1+x^2}{2+x^2}}$.

Q.18	Prove that: $\begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+y)^2 \end{vmatrix} = 2xyz(x+y+z)^3$.
Q.19	The probability of India wining a test match against West Indies is 1/3. Assuming independence from match to match .Find the probability that in a 5 match series India's second win occurs at the third test . OR A coin is biased so that the head is 3 times as likely to occur as tail. If the coin is tossed three times ,find the probability distribution of number of tails.
Q.20	Discuss the relation R in the set of real number , defined as $R = \{(a,b) : a \le b^3\}$ is Reflexive , Symmetric & Transitive .
Q.21	If $y = \frac{x\sin^{-1}x}{\sqrt{(1-x^2)}} + \log\sqrt{1-x^2}$. Prove that $\frac{dy}{dx} = \frac{\sin^{-1}x}{(1-x^2)^{3/2}}$. OR Prove that the derivative of $\tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$ with respect to $\tan^{-1}\left(\frac{2x\sqrt{1-x^2}}{1-2x^2}\right)$ at x = 0, is ¼ .
Q.22	Find the equation of the perpendicular drawn from the point P (2 , 4 , - 1) to the line $\frac{x+5}{1} = \frac{y+3}{4} = \frac{6-z}{9}$.
	Section C
Q.23	If $A^{-1} = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 2 \end{bmatrix}$ and B = $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$, $find(AB)^{-1}$
Q.24	A toy manufacturers produce two types of dolls ; a basic version doll A and deluxe version doll B. Each doll of type B takes twice as long to produce as one doll of type A . The company have time to make a maximum of 2000 , dolls of type A per day , the supply of plastic is sufficient to produce 1500 dolls per day and each type requires equal amount of it .The deluxe version i.e. type B requires a fancy dress of which there are only 600 per day available . If the company makes profit of ₹ 3 and ₹ 5 per doll respectively on doll A and B , how many of each should be produced weekly in order to maximize the profit ? Solve it by graphical method.
Q.25	Evaluate: $\int_0^{\pi} \frac{x}{a^2 - \cos^2 x} dx$.
Q.26	Using integration, find the area of the triangle bounded by the lines x + 2y = 2, y – x = 1 and 2x + y = 7.
Q.27	A, B and C play game and chances of their winning it in an attempt are 2/3, 1/2 and 1/4 respectively. A has the first chance, followed by B and then by C. This cycle is repeated till one of them wins the game. Find their respective chances of winning the game. OR How many time must a man toss a fair coin, so that the probability of having at least one head is more than 80%?
Q.28	State when the line $\vec{r} = \vec{a} + \lambda\vec{b}$ is a parallel to the plane $\vec{r}.\vec{n} = d$. Show that the line $\vec{r} = (\hat{i}+\hat{j}) + \lambda(2\hat{i}+\hat{j}+4\hat{k})$ is parallel to the plane $\vec{r}.(-2\hat{i}+\hat{k}) = 5$.Also find the distance between the line and the plane.
Q.29	Find the shortest distance of the point $(0, c)$ from the parabola $y = x^2$, where $0 \le c \le 5$. Or

	Prove that the radius of the right circular cylinder of greatest curved surface area which can be inscribed in a given cone is half of that of the cone.
	______________x_____________
	"Hard working is only the investment that never fails "

CODE:- AG-8-8936

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CLASS – XII CBSE MATHEMATICS

Section A

Q.1	Find the coordinates of the point where the line through (5, 1, 6) and (3, 4, 1) crosses the YZ-plane.
Q.2	If A is a non-singular matrix such that $A^{-1} = \begin{bmatrix} 5 & 3 \\ -2 & -1 \end{bmatrix}$, , then find $\left(A^T\right)^{-1}$, where A^T is transpose of A.

Q.3	Write the number of all one-one functions from the set A= { a, b ,c } to itself.
Q.4	In a triangle ABC, the sides AB and BC are represented by vectors $2\hat{i}-\hat{j}+2\hat{k}$, $\hat{i}+3\hat{j}+5\hat{k}$ respectively. Find the vector representing CA .
Q.5	Evaluate $\int_0^1 \frac{x}{x^2+1}dx.$
Q.6	Let $A=[a_{ij}]_{m\times 3}; B=[b_{ij}]_{p\times 4}\, and C=[c_{ij}]_{2\times 4}$ are such that $A_{m\times 3}.B_{p\times 4}=C_{2\times 4};$ find the value of m and p.
Q.7	Prove that : $\frac{9\pi}{8}-\frac{9}{4}\sin^{-1}\frac{1}{3}=\frac{9}{4}\sin^{-1}\frac{2\sqrt{2}}{3}$.
Q.8	The vectors $\vec{a}=3\hat{i}+x\hat{j}-\hat{k}$ & $\vec{b}=2\hat{i}+\hat{j}+y\hat{k}$ are mutually perpendicular. Given that $\lvert\vec{a}\rvert=\lvert\vec{b}\rvert$, find the values of x and y .
Q.9	A random variable x has the following probability distribution: x: 0, 1, 2, 3, 4, 5, 6, 7 $p(x)$: 0, k, $2k$, $2k$, $3k$, k^2, $2k^2$, $k+7k^2$ find the value of k.
Q.10	Evaluate : $\int \sec^2(7-x)dx$.
	Section B
Q.11	Find all the point of discontinuity of the function f defined by $f(x)=\begin{cases} x+2 & x\le 1 \\ x-2 & 1\langle x \langle 2 \\ 0 & x\ge 2\end{cases}$.
Q.12	Evaluate : $\int \frac{x^3+x}{x^4-9}dx.$ OR Evaluate: $\int \frac{e^{\tan^{-1}x}}{(1+x^2)^2}$ dx .
Q.13	Solve the differential equation : $x\frac{d^2y}{dx^2}=1$ given that $y=1, \frac{dy}{dx}=0, when\ x=1.$
Q.14	If $y=(\cos x)^{\log x}+(\log x)^x; find \frac{dy}{dx}.$
Q.15	If a unit vector $\vec{a}$ makes angles $\frac{\pi}{4}$ and $\frac{\pi}{3}$ with x –axis and y – axis respectively and an acute angle θ with z-axis, then find θ and the (scalar and vector) components of $\vec{a}$ along the axes.
Q.16	Solve the equation : $\sec^{-1}\frac{x}{a}-\sec^{-1}\frac{x}{b}=\sec^{-1}b-\sec^{-1}a\cdot$ OR Prove that : $\sin\left(2\tan^{-1}\frac{1}{3}\right)+\cos\left(\tan^{-1}2\sqrt{2}\right)=\frac{14}{15}\cdot$
Q.17	Using the properties of determinants, prove the following: $\begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix}=2\begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z\end{vmatrix}$.
Q.18	Neelam is taking up subjecte mathematics, physics and chemistry. She estimates that his probabilities of receiving grade A in these course are 0.2 , 0.3 and 0.9 respectively. If the grades can be regarded as independent events find the probabilities that the receives : (i) All A's (ii) Exactly two A's
Q.19	Show that each of the relation R in the set A = { $x\in 2: 0\le x\le 12\}$,given by

	(i) R= {(a,b): $\|a-b\|$. is a multiple of 4} . (ii)R= {(a,b):a = b} is an equivalence relation .Find the set of all elements to 1 in each cases.
Q.20	Find the intervals in which the function f given by $f(x)=\frac{4\sin x-2x-x\cos x}{2+\cos x}$ on $[0,2\pi]$ is (i) increasing (ii) decreasing. OR The two equal sides of an isosceles triangle with fixed base b are decreasing at the rate of 3 cm/ sec . How fast is the area decreasing when the two equal sides are equal to the base?
Q.21	Show that $y=\operatorname{cosec}^{-1}x$ is a solution of the differential equation $x\left(x^2-1\right)\frac{d^2y}{dx^2}+\left(2x^2-1\right)\frac{dy}{dx}=0$. OR Find the general solution of the differential equation : $x\log x.\frac{dy}{dx}+y=\frac{2}{x}.\log x$
Q.22	By examining the chest X-ray, the probability that T.B. is detected when a person is actually suffering is 0.99.The probability that the doctor diagnoses is incorrectly that a person has T.B. on the basis of x-ray is 0.001.In a certain city , 1in 1000 persons suffers from TB. A person is selected at random and is diagnosed to have T.B. What is the chance that he actually has T.B.?
	Section C
Q.23	Using integration, find the area of the triangle bounded by the lines y = 2x + 1, y = 3x +1 and x = 4. OR Sketch the region common to the circle $x^2+y^2=25$ and the parabola $y^2=8x$. Also , find the area of the region using integration.
Q.24	Evaluate: $\int_0^{3/2}\|x\cos\pi x\|dx$.
Q.25	State the condition under which the following system of equations have a unique solutions. If A=$\begin{bmatrix}9&7&3\\5&-1&4\\6&8&2\end{bmatrix}$,find A^{-1} and hence solve the following system of equations: 9x + 7y + 3z = 6; 5x – y + 4z = 1; 6x + 8y + 2z = 4 .
Q.26	Prove that the lines $\frac{X+4}{3}=\frac{Y+6}{5}=\frac{Z-1}{-2}$ and 3x-2y+z+5=0; 2x+3y+4z- 4=0 are coplanar . Also write the equation of plane in which they lie.
Q.27	A rectangular sheet of paper for a poster is 15000 sq. cm. in area. The margins at the top and bottom are to be 6 cm. wide and at the sides 4 cm. wide. Find the dimensions of the sheet to maximize the printed area. OR A square tank of capacity 250 cubic metres has to be dug out. The cost of the land is ₹ 50 per sq meter. The cost of digging increases with the depth and for the whole tank it is ₹ 400h^2, where h meters is the depth of the tank. What should be the dimension of the tank so that the cost be minimum?
Q.28	Find the equation of the plane parallel to line $\frac{x}{1}=\frac{y-7}{-3}=\frac{z+7}{2}$ and containing the lines $\frac{x+1}{-3}=\frac{y-3}{2}=\frac{z+2}{1}$ in vector and Cartesian form ,also find distance of plane from origin .
Q.29	A furniture firm manufactures chairs and tables, each requiring the use of three machines A, B and C. Production of one chair requires 2 hours on machine A, 1 hour on machine B and 1 hour on machine C. Each table requires 1 hour each on machine A and B and 3 hours on machine C. The profit obtained by selling one chair in ₹ 30 while by selling one table the profit is ₹ 60. The total time available per week on machine A is 70 hours, on machine B is 40 hours and on machine C is 90 hours. How many chairs and tables should be made per week so as to maximize profit? Formulate the problem as L.P.P. and solve it graphically.

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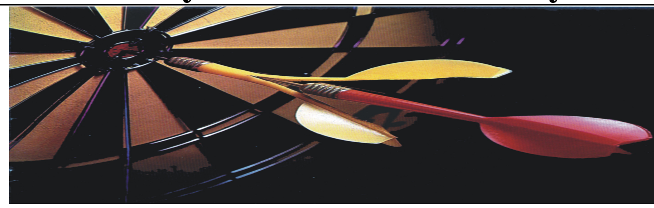

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CLASS – XII CBSE MATHEMATICS

Section A

Q.1	Check whether the relation R in R defined by R = $\{(a,b): a \le b^2\}$ is transitive.
Q.2	Evaluate : $\int \frac{\cos 2x - \cos 2\alpha}{\cos x - \cos \alpha} dx.$

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Q.3	Find the value of k for which the matrix $\begin{pmatrix} k & 2 \\ 3 & 4 \end{pmatrix}$ has no inverse.
Q.4	Write the principal branch of $\sec^{-1} x$.
Q.5	Find the value of x if the area of Δ is 35 square cms with vertices (x,4),(2, -6)and (5,4).
Q.6	Evaluate : $\int [1+2\tan x(\tan x+\sec x)]^{1/2} dx.$
Q.7	Write down a unit vector in XY-plane, making an angle of 30° with the positive direction of *x*-axis.
Q.8	If $\vec{a}\ and\ \vec{b}$ are non-collinear vectors, find the value of x for which the vectors $\vec{I}=(2x+1)\vec{a}-\vec{b}\ and\ \vec{m}=(x-2)\vec{a}+\vec{b}$ are collinear.
Q.9	If $\vec{a}=\vec{b}+\vec{c}$, then is it true that $\lvert\vec{a}\rvert=\lvert\vec{b}\rvert+\lvert\vec{c}\rvert$? Justify your answer.
Q.10	Find the perpendicular distance from (2,5,6) on XY plane .
	Section B
Q.11	Solve the following equation : $3\sin^{-1}\frac{2x}{1+x^2}-4\cos^{-1}\frac{1-x^2}{1+x^2}+2\tan^{-1}\frac{2x}{1-x^2}=\frac{\pi}{3}$. OR Solve for x : $2\tan^{-1}(\sin x)=\tan^{-1}(2\sec x), 0 < x < \frac{\pi}{2}$.
Q.12	If f(x) and g (x) be two invertible function defined as $f(x)=\frac{2x+1}{3x-5}$ be defined as $g(x)=\frac{3x+3}{7x-2}$. Prove that $(gof)^{-1}=f^{-1}og^{-1}$.
Q.13	Using the properties of determinants, prove the following: $\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix}=(1+a^2+b^2)^3$.
Q.14	An air force plane is ascending vertically at the rate of 100 km/ h. If the radius of the earth is r km, how fast is the area of the earth , visible from the plane , increasing at 3 minutes after it started ascending ? Given that the visible area A at height h is given by $A=\frac{2\pi r^2 h}{r+h}$.
Q.15	If $y=\sin(m\sin^{-1}x)$, prove that $(1-x^2)\frac{d^2y}{dx^2}-x\frac{dy}{dx}+m^2y=0$. OR If $x^y=e^{x-y}$, prove that $\frac{dy}{dx}=\frac{\log x}{(1+\log x)^2}$.
Q.16	Find the distance of the point (2,3,4) from the line $\frac{x+3}{3}=\frac{y-2}{6}=\frac{z}{2}$ measured parallel to the plane 3x + 2y + 2z - 5 = 0.
Q.17	Find all the local maximum values and local minimum values of the function

	$f(x) = \sin 2x - x, -\frac{\pi}{2} < x < \frac{\pi}{2}$.
Q.18	Evaluate $\int \frac{\sin 4x - 2}{1 - \cos 4x} e^{2x} dx.$
Q.19	Solve the differential equation : $(3xy + y^2)dx + (x^2 + xy)dy = 0.$ OR Solve the differential equation, $(1 + y + x^2 y)dx + (x + x^3)dy = 0$ where y = o when x = 1
Q.20	A girl walks 4 km towards west, then she walks 3 km in a direction 30° east of north and stops. Determine the girl's displacement from her initial point of departure. OR If $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$ & $\vec{b} = 3\hat{i} + \hat{j} + 2\hat{k}$, find a unit vector which is linear combination of $\vec{a}$ & $\vec{b}$ and is also perpendicular to $\vec{a}$.
Q.21	Form the differential equation of the family of curve $y = ae^x + be^{2x} + ce^{3x}$; where a, b, c are some arbitrary constants.
Q.22	Evaluate : $\int \frac{x}{x^3 - 1} dx$.
	Section C
Q.23	Let A be a square symmetric matrix, Show that : (i) $\frac{1}{2}(A + A')$ is a symmetric matrix. (ii) $\frac{1}{2}(A - A')$ is a skew symmetric matrix. Also prove that any square matrix can be uniquely expressed as the sum of a symmetric matrix and a skew-symmetric matrix. OR Find the matrix P satisfying the matrix equation $\begin{bmatrix} 2 & 1 \\ 3 & 2 \end{bmatrix} p \begin{bmatrix} -3 & 2 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$.
Q.24	Find the equation of the line passing through the point P(4, 6, 2) and the point of intersection of the line $\frac{x-1}{3} = \frac{y}{2} = \frac{z+1}{7}$ and the plane x + y – z = 8 .
Q.25	Assume that the chances of a patient having a heart attack is 40%. It is also assumed that a meditation and yoga course reduce the risk of heart attack by 30% and prescription of certain drug reduces its chances by 25%. At a time a patient can choose any one of the two options with equal probabilities. It is given that after going through one of the two options the patient selected at random suffers a heart attack. Find the probability that the patient followed a course of meditation and yoga?
Q.26	Draw the rough sketch of the region enclosed between the circles $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 1$. Using integration, find the area of the enclosed region. OR Find the area lying above *x*-axis and included between the circle $x^2 + y^2 = 2ax$ and the parabola $y^2 = ax$.
Q.27	Prove that all normals to the curve $x = a\cos t + at\sin t, y = a\sin t - at\cos t$ are at a distance a from the origin.
Q.28	Evaluate: $\int_0^{\pi} x \log \sin x \, dx$.
Q.29	A fruit grower can use two types of fertilizer in his garden, brand P and brand Q. The amounts (in kg) of nitrogen, phosphoric acid, potash, and chlorine in a bag of each brand are given in the table. Tests indicate that the garden needs at least 240 kg of phosphoric acid, at least 270 kg of potash and at most 310 kg of chlorine. If the grower wants to minimize the amount of nitrogen added to the garden, how many bags of each brand should be used? What is the minimum amount of nitrogen added in the garden?

kg per bag		
	Brand P	Brand Q
Nitrogen	3	3.5
Phosphoric acid	1	2
Potash	3	1.5
Chlorine	1.5	2

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"Success is a journey, not a destination"

CODE:- AG-10-1899

REG.NO:-TMC -D/79/89/36

General Instructions :

22. All question are compulsory.
23. The question paper consists of 29 questions divided into three sections A,B and C. Section – A comprises of 10 question of 1 mark each. Section – B comprises of 12 questions of 4 marks each and Section – C comprises of 7 questions of 6 marks each .
24. Question numbers 1 to 10 in Section – A are multiple choice questions where you are to select one correct option out of the given four.
25. There is no overall choice. However, internal choice has been provided in 2 question of four marks and 2 questions of six marks each. You have to attempt only one If the alternatives in all such questions.
26. Use of calculator is not permitted.
27. Please check that this question paper contains 3 printed pages.
28. Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.

सामान्य निर्देश :

1. सभी प्रश्न अनिवार्य हैं।
2. इस प्रश्न पत्र में 29 प्रश्न है, जो 3 खण्डों में अ, ब, व स है। खण्ड – अ में 10 प्रश्न हैं और प्रत्येक प्रश्न 1 अंक का है। खण्ड – ब में 12 प्रश्न हैं और प्रत्येक प्रश्न 4 अंको के हैं। खण्ड – स में 7 प्रश्न हैं और प्रत्येक प्रश्न 6 अंको का है।
3. प्रश्न संख्या 1 से 10 बहुविकल्पीय प्रश्न हैं। दिए गए चार विकल्पों में से एक सही विकल्प चुनें।
4. इसमें कोई भी सर्वोपरि विकल्प नहीं है, लेकिन आंतरिक विकल्प 2 प्रश्न 4 अंको में और 2 प्रश्न 6 अंको में दिए गए हैं। आप दिए गए विकल्पों में से एक विकल्प का चयन करें।
5. कैलकुलेटर का प्रयोग वर्जित हैं ।
6. कृपया जाँच कर लें कि इस प्रश्न–पत्र में मुद्रित पृष्ठ 3 हैं।
7.

Pre-Board Examination 2010 -11

Time : 3 Hours	अधिकतम समय : 3
Maximum Marks : 100	अधिकतम अंक : 100
Total No. Of Pages :3	कुल पृष्ठों की संख्या : 3

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CLASS – XII	CBSE MATHEMATICS
	Section A
Q.1	Find the value of $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$
Q.2	If $\int_0^1 (3x^2+2x+k)dx = 0$, find the value of k.
Q.3	If A = $\begin{bmatrix} 0 & i \\ i & 1 \end{bmatrix}$ and B = $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$, find the value of $\lvert A\rvert + \lvert B\rvert$.
Q.4	If the binary operation * on the set of integers Z, is defined by $a * b = a + 3b^2$, then find the value of 2 * 4.
Q.5	If $\lvert\vec{a}+\vec{b}\rvert = \lvert\vec{a}-\vec{b}\rvert$. then find the angle between $\vec{a}$ and $\vec{b}$.
Q.6	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
Q.7	Evaluate $\int \frac{dx}{x\cos^2(1+\log x)}$.
Q.8	If $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} 3 & 1 \\ 2 & 5 \end{pmatrix} = \begin{pmatrix} 7 & 11 \\ k & 23 \end{pmatrix}$, then write the value of k.
Q.9	If A is non-singular matrix of order 3 and $\lvert adjA\rvert = \lvert A\rvert^K$, then write the value of k.
Q.10	Find the angle between two vectors $\vec{a}$ & $\vec{b}$ having the same length $\sqrt{2}$ and their scalar product is -1.
	Section B
Q.11	Find the image of the point having position vector $\hat{i}+3\hat{j}+4\hat{k}$ in the plane $\vec{r}.(2\hat{i}-\hat{j}+\hat{k})+3=0$
Q.12	Evaluate $\int \frac{x^2+x+1}{(x+2)(x^2+1)}$.
Q.13	Show that $\frac{1}{2}\overrightarrow{AC}\times\overrightarrow{BD}$ represents the vector area of the plane quadrilateral ABCD. Also find the area of quadrilateral whose diagonals are $4i - j - 3k$ & $-2i + j - 2k$.
Q.14	Is f (x) = $\lvert x-1\rvert + \lvert x-2\rvert$ continuous and differentiable at x = 1, 2 .
Q.15	From the differential equation of the family of circles touching the x-axis at origin.
Q.16	Using properties of determinants, prove that : $\begin{vmatrix} a^2+1 & ab & ac \\ ab & b^2+1 & bc \\ ca & cb & c^2+1 \end{vmatrix} = (1+a^2+b^2+c^2)$.
Q.17	Find the particular solution, satisfying the given condition, for the following differential equation . $\frac{dy}{dx} - \frac{y}{x} + \cos ec\left(\frac{y}{x}\right) = 0, y = 0 when x = 1$ OR

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	Solve : $\left(\frac{e^{-2\sqrt{x}}}{\sqrt{x}}-\frac{y}{\sqrt{x}}\right)\frac{dx}{dy}=1, x\neq 0.$
Q.18	let R $_+$ be the set of all non-negative real numbers Let f : R $_+$ $\rightarrow [4,\infty): f(x)=x^2+4$. Show that f is invertible that find f^{-1}
Q.19	Find the value of x for which $f(x)=[x(x-2)]^2$ is an increasing function. Also, find the points on the curve, where the tangents is parallel to x-axis. , OR Find the equation of the normals to the curve y = x^3+2x+6 which are parallel to the line x + 14y + 4 = 0.
Q.20	A football match may be either won , drawn or lost by the host country's team . So there are three ways of forecasting the result of any match , one correct and two incorrect . Find the probability forecasting at least three correct result for four matches .
Q.21	If $x=a(\cos\theta+\log\tan\frac{\theta}{2})$ & $y=a\sin\theta,$ find the value of $\frac{d^2y}{dx^2} at \theta=\frac{\pi}{4}.$ OR Differentiate w.r.t.x: $y=\frac{(2x+3)\sqrt{3x-4}}{(x^2+1)^3}, find \frac{dy}{dx}$
Q.22	Prove that : $2\tan^{-1}\left[\sqrt{\frac{a-b}{a+b}}\tan\frac{\theta}{2}\right]=\cos^{-1}\left(\frac{b+a\cos\theta}{a+b\cos\theta}\right)$. . OR Prove that : $\tan^{-1}(1)+\tan^{-1}(2)+\tan^{-1}(3)=\pi$.
	Section C
Q.23	Find the inverse of the matrix $A=\begin{bmatrix}1 & 2 & -2\\ -1 & 3 & 0\\ 0 & -2 & 1\end{bmatrix}$ by using elementary row transformations.
Q.24	A small firm manufactures gold rings and chains. The total number of rings and chains manufactured per day is at most 24. It takes 1 hour to make a ring and 30 minutes to make a chain. The maximum number of hours available per day is 16. If the profit on a ring is ₹ 300 and that on a chain is ₹ 190, find the number of rings and chains that should be manufactured per day , so as to earn the maximum profit. Make it as an L.P.P. and solve it graphically.
Q.25	Using integration, find the area of the region bounded by the curve $x^2=4y$ and the line x = 4y -2. OR Find the area bounded by the curve $y^2=4a^2(x-1)$ and the lines x = 1 and y = 4a.
Q.26	The sum of the surface areas of a rectangular parallelepiped with side x, 2x and $\frac{x}{3}$ and a sphere gives to the constant. Prove that the sum of their volume is minimum if x is equal to three times the radius of sphere. Find the minimum value of the sum of the volumes. OR A rectangle is inscribed in a semi-circle of radius 'a' with one of its sides on the diameter of semi-circle. Find the dimensions of the rectangle so that its area is maximum. Find the area also.

Q.27	Evaluate : $\int_{1}^{3}\left(2x^2+3x+7\right)dx$ as limit of sums.
Q.28	A bag contain 4 balls . Two balls are drawn at random , and are found to be white . What is the probability that all balls are white ?
Q.29	Find the equation of the plane through the intersection of planes 3x - y + 4 z = 0 and x +3 y + 6 = 0 , whose perpendicular distance from the origin equal to 1 .
	______________x_____________
	"Confidence is the companion of success"

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