MODEL PAPER_CBSE-XII'20

According to the Syllabus & Guidelines of CBSE'20

CLASS-XII (2019-2020)

QUESTION WISE BREAK UP

Type of Question	Mark per Question	Total No. of Questions	Total Marks
VSA	1	20	20
SA	2	06	12
LA-I	4	06	24
LA-II	6	04	24
	Total	36	80

CHAPTERWISE MARKS in Class-XII (CBSE)

Sr. No	TOPICS	MARKS					
		VSA(1M)	SA(2M)	S A (4M)	L A (6M)	Total Marks	
1 a	Relation & Function	1	**OR**	1			
1 b	Binary operation						08
1 c	Inverse Trig. Func	1	1				
2.a	Matrices	1+1+1			**OR**		10
b	Determinant	1			1		
3.a.	Continuity, Differentiability, DERIVATIVE	1		1 OR			
b.	Applications Of Derivative	1 OR	1		1 **OR**		
c.	Integrals	1+1+1+1 **OR**		1			35
d	Applications Of Integrals				1		
e	Differential Equations	1	1	1			
4.a	Vectors	1+1 **OR**	1 **OR**			04	14
b	Three Dimensional Geometry	1+1	1		1	10	
5.	Linear Programming	1		1			05
6.	Probability	1+1	1	1 **OR**			08
	TOTAL	20	12	24	24		80

[Mp 01F Cbse Xii'20 Q 191130] MODEL TEST [Pre CBSE-XII'20] [FM–80/Time–3 hrs.]

GENERAL INSTRUCTIONS:

(i) **All** questions are compulsory.
(ii) This question paper contains **36** questions.
(iii) Question **1- 20** in **Section A** are very short-answer type questions carrying **1** mark each.
(iv) Question **21-26** in **Section B** are short-answer type questions carrying **2** marks each.
(v) Question **27-32** in **Section C** are long-answer-**I** type questions carrying **4** marks each.
(vi) Question **33-36** in **Section D** are long-answer-**II** type questions carrying **6** marks each.

SECTIONS – A (Questions 01 to 20 carry 1 marks each)

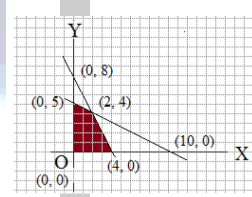
1. The function $f: N \to N$, is defined as f(x) = 2x + 1, then f(x) is
a) One-one b) One-one & Into c) One-one & Onto d) None of these

2. If A is a square matrix of order 3 and |3A| = k|A|, then find the value of k.
a) k = 3 b) k = 9 c) k = 27 d) none of these

3. Write the value of $\hat{i}.\left(\hat{j}\times\hat{k}\right)+\hat{j}.\left(\hat{i}\times\hat{k}\right)+\hat{k}.\left(\hat{i}\times\hat{j}\right)$.
a) 0 b) 1 c) – 1 d) 3

4. The king, queen and ace of spade are removed from a deck of well shuffled 52 playing cards. Find the probability of drawing a heart card.
a) $\frac{1}{4}$ b) $\frac{5}{26}$ c) $\frac{13}{49}$ d) $\frac{10}{49}$

5. Determine the maximum value of Z = 5x + 7y , if the feasible region for an LPP is the shaded part in adjacent figure.



6. Find the value of $\tan^{-1}\left(\frac{x}{y}\right)-\tan^{-1}\left(\frac{x-y}{x+y}\right)$.
a) $2\tan^{-1}\frac{x}{y}-\frac{\pi}{4}$ b) $2\tan^{-1}\frac{x}{y}+\frac{\pi}{4}$ c) $\frac{\pi}{4}$ d) $-\frac{\pi}{4}$

7. Find the distance of the plane 2x – 3y +4z – 6 = 0 from the origin.

8. Evaluate: $\int\frac{\cos x}{\sin(x-a)}dx$.
a) $\cos a.\log\{\sin(x-a)\}-x.\sin a+C$ b) $\cos a.\log\{\sin(x-a)\}+x.\sin a+C$
c) $-\cos a.\log\{\sin(x-a)\}-x.\sin a+C$ d) $-\cos a.\log\{\sin(x-a)\}-\sin a+C$

9. If $P(A)=\frac{7}{13}$, $P(B)=\frac{9}{13}$ and $P(A/B)=\frac{4}{9}$, then find $P(A\cap B)$.

10. Find the distance of the point whose position vector is $2\hat{i}+\hat{j}-\hat{k}$ from the plane $\vec{r}\left(\hat{i}-2\hat{j}+4\hat{k}\right)=9$.

11. Solve the matrix equation : $\begin{bmatrix} x & 1\end{bmatrix}\begin{bmatrix}1 & 0\\ -2 & -3\end{bmatrix}\begin{bmatrix}x\\ 5\end{bmatrix}=O$

12. If f(x) is differentiable at x = a, then find $\lim_{x \to a} \frac{x^2 f(a) - a^2 f(x)}{x - a}$

13. If A is a square matrix such that $A^3 = I$, then $A^{-1} =$

i) I ii) A iii) A^2 iv) A^3

14. Find the equation of the normal at (2, 2) on the hyperbola xy = 4.

OR, Find the intervals in which $f(x) = x^2 - 4x + 6$ is : a) strictly increasing b) strictly decreasing.

15. A and B are two points whose position vectors are $\left(2\vec{a} - \vec{b}\right)$ and $\left(\vec{a} + 2\vec{b}\right)$ respectively. If the point C divides the joining of points A and B externally in the ratio of 2 : 1, then find position vector of C.

OR, Write the direction cosines of the vector $-2\hat{i} + \hat{j} - 5\hat{k}$.

16. If $\Delta = \begin{vmatrix} Ax & x^2 & 1 \\ By & y^2 & 1 \\ Cz & z^2 & 1 \end{vmatrix}$ and $\Delta_1 = \begin{vmatrix} A & B & C \\ x & y & z \\ yz & zx & xy \end{vmatrix}$, then, which one is correct ?

(i) $\Delta \neq \Delta_1$ (ii) $\Delta = \Delta_1$ (iii) $\Delta = xyz\Delta_1$ (iv) None of these

17. Evaluate : $\int_{-1}^{1} \frac{x^3}{x^2 + 2} . dx$.

18. Evaluate : $\int \frac{\sec x}{\sec x + \tan x} dx$

OR, Evaluate : $\int \frac{dx}{x^2 - 16}$

19. Evaluate : $\int \frac{\sqrt{\tan x}}{\sin x . \cos x} dx$

20. Solve : $\frac{dy}{dx} = \sqrt{y - x}$

<u>SECTIONS</u> – B (Questions 21 to 26 carry 2 marks each.)

21. Evaluate: $\cos(2\cos^{-1} x + \sin^{-1} x)$ at x = 1/5, where $0 \le \cos^{-1} x \le \pi$ and $-\frac{\pi}{2} \le \cos^{-1} x \le \frac{\pi}{2}$.

OR, Let f : N → N be a function defined as $f(x) = 9x^2 + 6x - 5$. Show that f : N → S, where S is the range of f, is invertible. Find the inverse of f and hence find $f^{-1}(43)$ & $f^{-1}(163)$.

22. If $y = \tan^{-1}\left(\frac{\tan x + \sec x - 1}{\tan x - \sec x + 1}\right)$ then find $\frac{d^2y}{dx^2}$.

23. Find the values of x for which $y = \{x(x-2)\}^2$ is an increasing function.

24. Magnitude of a vector is 5 and it is perpendicular to each of two given vectors $\vec{a} = 2\hat{i} + \hat{j} - 3\hat{k}$ and $\vec{b} = \hat{i} - 2\hat{j} + \hat{k}$. Find the vector.

OR, Given A (1, 1, 2), B (2, 3, 5) and C (1, 5, 5). Find $\overrightarrow{AB} \times \overrightarrow{BC}$.

25. Find the angle between the two planes $3x - 6y + 2z = 7$ & $2x + 2y - 2z = 5$.

26. Given $P(A) = \frac{1}{4}$, $P(B) = \frac{1}{3}$ and $P(A \cap \overline{B}) = \frac{1}{6}$. Test whether A and B are independent events or not.

<u>SECTIONS</u> – C (Questions 27 to 32 carry 4 marks each.)

27. Show that the function $f : R \rightarrow R$ defined by $f(x) = 2x^3 - 7$, is bijective. _P–70]

28. Given $x = a.(2t + \sin 2t)$ and $y = a.(1 - \cos 2t)$ (a is constant). Find $\frac{dy}{dx}$

OR, If $x = a(\cos\theta + \theta\sin\theta)$ and $y = a(\sin\theta - \theta\cos\theta)$, then find $\frac{d^2y}{dx^2}$.

29. Solve the following differential equation: $x\frac{dy}{dx} - y = \sqrt{x^2 + y^2}$.

30. Evaluate : $\int_1^4 \left[\, |x-1| + |x-2| + |x-4| \,\right] dx$.

31. Two groups are competing for the position on the Board of Directors of a corporation. The probabilities that the first and the second groups will win are 0.6 and 0.4 respectively. Further if the first group wins the probability of introducing a new product is 0.7 and the corresponding probability is 0.3 if the second group wins. Find the probability that the new product introduced was by the second group.

OR, Probabilities of solving a specific problem independently by A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, find the probability that (i) the problem is solved (ii) exactly one of them solves the problem. [mtd–feb'11_P–71] [4]

32. A dietician has to develop a special diet using two foods P and Q. Each packet (containing 30 g) of food P contains 12 units of calcium, 4 units of iron, 6 units of cholesterol and 6 units of vitamin A. Each packet of the same quantity of food Q contains 3 units of calcium, 20 units of iron, 4 units of cholesterol and 3 units of vitamin A. The diet requires at least 240 units of calcium, atleast 460 units of iron and at most 300 units of cholesterol. How many packets of each food should be used to minimise the amount of vitamin A in the diet? What is the minimum amount of vitamin A?

<u>SECTIONS</u> – D (Questions 33 to 36 carry 6 marks each)

33. Prove that, $\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix} = (1+a^2+b^2)^3$.

OR, Express the matrix $A = \begin{bmatrix} 3 & 4 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix}$ as the sum of a symmetric matrix and a skew symmetric matrix.

34. Prove that the area enclosed by $y^2 = 12ax$ and $x^2 = 12ay$ is $48a^2$ square units.

35. A tank with rectangular base and rectangular sides open at the top is to be constructed so that it's depth is 2 m and volume is 8 m^3. If building of tank cost Rs. 70 per *sq* meter for the base and Rs. 45 per *sq* meter for the sides. What is the cost of least expensive tank.

OR, Prove that the rectangle of maximum area that can be inscribed in a circle is a square.

36. Find the co-ordinates of the foot of perpendicular drawn from the point A (1, 8, 4) to the line joining the points B (0, –1, 3) and C (2, –3, –1).

“Learning is a Treasure, which accompanies its owner everywhere.”

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