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ਵੱਲ

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ਸਬੰਧਤ ਅਧਿਆਪਕ

ਮੀਮੋ ਨੰ: SCERT,OP/UP/2018100715
ਮਿਤੀ:- 11-12-2018

ਵਿਸ਼ਾ :- 12ਵੀਂ ਜਮਾਤ ਦਾ 2018-19 ਲਈ ਨਮੂਨੇ ਦਾ ਗਣਿਤ ਵਿਸ਼ੇ ਦੇ ਮਾਡਲ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਸਬੰਧੀ। (Revision Papers)

1.0 ਉਪਰੋਕਤ ਵਿਸ਼ੇ ਵੱਲ ਧਿਆਨ ਦੇਣ ਦੀ ਖੇਚਲ ਕੀਤੀ ਜਾਵੇ ਜੀ।

2.0 ਮਾਣਯੋਗ ਸੱਕਤਰ ਸਕੂਲ ਸਿੱਖਿਆ ਪੰਜਾਬ ਜੀ ਦੇ ਆਦੇਸ਼ਾਂ ਹਿੱਤ, ਬਾਹਰਵੀਂ ਜਮਾਤ ਦਾ ਗਣਿਤ ਵਿਸ਼ੇ ਦਾ 2018-19 ਲਈ ਮਾਡਲ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਤਿਆਰ ਕੀਤਾ ਗਿਆ ਹੈ।ਇਸ ਨੂੰ ਅਧਿਆਪਕ ਵਰਗ ਅਤੇ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਸਹੂਲਤ ਲਈ www.ssapunjab.org ਦੀ **website** ਤੇ ਅਪਲੋਡ ਕੀਤਾ ਜਾ ਰਿਹਾ ਹੈ।

ਨੱਥੀ:- ਮਾਡਲ ਪ੍ਰਸ਼ਨ-ਪੱਤਰ ਜਮਾਤ ਬਾਹਰਵੀਂ ਵਿਸ਼ਾ ਗਣਿਤ।

ਸਹਾਇਕ ਡਾਇਰੈਕਟਰ
ਐਸ.ਸੀ.ਈ.ਆਰ.ਟੀ, ਪੰਜਾਬ

ਸਕੂਲ ਸਿੱਖਿਆ ਵਿਭਾਗ, ਪੰਜਾਬ

SUBJECT: MATHEMATICS

MODAL TEST PAPER 2018-19

Time: 3 hour **Class: ਬਾਰਵੀਂ** **M.M. 90**

1. All questions are compulsory
2. Q1 consists of 10 parts and each part will carry one mark.
3. Q2 to Q9 each will be of 2 marks
4. Q10 to Q19 each will be of 4 marks
5. Q 20 to Q23 each will be of 6 marks.
6. Use of calculator is not allowed.

Part- A

Q1. (i). If f(x)=sin x and g(x)=5x then fog(x) is:

(a)5sin x (b) sin(5x) (c) $(\sin x)^5$ (d) $sin\left(\frac{x}{5}\right)$

(ii). If $\cos^{-1}x=y$ then x belongs to

(a) (0,1) (b) (-1,1) (c) [-1,1] (d) [0,1]

(iii). If A is a square of matrix of order 4X4 and |A|=3 then |Adj.(A)| is

(a) 27 (b) 81 (c) 9 (d) 3

(iv). If f(x)= $\begin{cases} \frac{sin7x}{3x}, x \neq 0 \text{ is continuous at } x = 0 \text{ then} \\ m, \quad x = 0 \end{cases}$

value of m is

(a) $\frac{3}{7}$ (b) $\frac{4}{7}$ (c) $\frac{7}{4}$ (d) $\frac{7}{3}$

(v). If y=log(sin x) then $\frac{dy}{dx}$ at x=$\frac{\pi}{4}$ is

(a) 0 (b) -1 (c) 1 (d) $\sqrt{2}$

(vi). $\int_{-1}^{1} x\, sin^2x\, dx$ is equal to

(a) 0 (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) -1

(vii). Order of differential equation $\frac{d^3x}{dx^3}$ - $4\left(\frac{d^2x}{dx^2}\right)^4 + y = 0$ *is*

(a) 3 (b) 4 (c) 1 (d) 0

P.T.O.

(viii). $|\vec{a}\cdot\vec{b}| = |\vec{a}\times\vec{b}|$ then angle between $\vec{a}$ and $\vec{b}$ is

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

(ix). Direction ratios of normal to the plane 5x-y+3z=10 are

(a) $\langle 5,1,3\rangle$ (b) $\langle -5,-1,3\rangle$ (c) $\langle 5,-1,3\rangle$ (d) $\langle 5,-1,-3\rangle$

(x). If P(E)=$\frac{5}{7}$ then P(not E) is

(a) $\frac{5}{7}$ (b) $\frac{7}{5}$ (c) $\frac{7}{2}$ (d) $\frac{2}{7}$

Part- B

Q2. If A=$\begin{bmatrix}3 & 2\\ 5 & -7\end{bmatrix}$ and f(x)=x^2+3x-5 then find f(A)

Q3. If 4x-6y=cos x then find $\frac{dy}{dx}$

Q4. Evaluate $\int_0^3 (x^3+4)dx$

Q5. Solve $\int \frac{1}{x^2+5x+10}\,dx$

Q6. Form the differential equation representing the family of curves $x^2+y^2=r^2$ where r is an arbitrary constant

Q7. Find the integrating factor of the differential equation :

$$\frac{xdy}{dx}+y=x^2\sin x$$

Q8. Find the equation of plane passing from the point(1,-2,1) and plane is perpendicular to the line $\frac{x+1}{2}=\frac{y-1}{5}=\frac{z-3}{7}$.

Q9. If P(A)=2 p(B)=$\frac{3}{5}$ where A and B are independent events then find P(A∪B) and P(A|B).

Part-C

Q10. Prove that function f:$\mathbf{R}\rightarrow\mathbf{R}$, f(x)=$\frac{3x+5}{7}$ is invertible. Also find f^{-1}.

Or

If f(x)=$(3-x^3)^{\frac{1}{3}}$ then find fof(x). Also find f^{-1}

Q11. Prove that $2\tan^{-1}\left(\frac{1}{2}\right)+\tan^{-1}\left(\frac{1}{7}\right)=\tan^{-1}\left(\frac{31}{17}\right)$.

Q12. Express $\begin{bmatrix}2 & 5\\ 6 & -1\end{bmatrix}$ as sum of a symmetric matrix and a skew-symmetric matrix.

Q13. If y=$(tanx)^x+x^x$ then find $\frac{dy}{dx}$

OR

If y=$e^{3\tan^{-1}x}$ then prove that $(1+x^2)^2y_2+2x(1+x^2)y_1-9y=0$

Q14. Find the equation of tangent and normal to the curve $y=3x^2+5$ at the point where tangent is parallel to line y=6x+5.

P.T.O.

Q15. Solve $\int \frac{1}{x(x-1)(x+2)}dx$

OR

Evaluate $\int_2^6 (x^2+3)dx$ as limit of a sum.

Q16. Find the area of region bounded by circle $x^2+y^2=16$ and line y=x and x-axis in the first quadrant.

Q17. Solve the differential equation xdy-ydx=$\sqrt{x^2+y^2}$ dx.

Q18. Find the area of a triangle with vertices (1,1,3), (5,6,-2) and (7,8,-4) using vectors.

Q19. Find the probability distribution of number of aces if two cards are drawn from the well shuffled deck of 52 cards.

Part-D

Q20. Solve the following system of linear equations by matrix method:

x+y+z=3, 5x-y-z=3, 3x+2y-4z=1

OR

Using elementary transformations find inverse of $\begin{bmatrix} 1 & 1 & 1 \\ 5 & -1 & -1 \\ 3 & 2 & -4 \end{bmatrix}$

Q21. A wire of length 45m is to be cut into two pieces. One piece is to be made into a circle and other into a square. Find the lengths of two pieces so that the combined area of circle and square is minimum.

OR

Find the height of right circular cone of maximum volume that can be inscribed in a sphere of radius 21cm.

Q22. Find the image of a point(5,2,-1) in the plane 3x+2y-z=30.

OR

Find the shortest distance between the lines:

$\hat{r} = \hat{\imath} + 2\hat{\jmath} - 3\hat{k} + \lambda(5\hat{\imath} - \hat{\jmath} + \hat{k})$ and $\hat{r} = 2\hat{\imath} - 3\hat{\jmath} + \hat{k} + \mu(3\hat{\imath} + 2\hat{\jmath} - 5\hat{k})$

Q23. Maximize & minimize Z=5x+3y-1 subject to the constraints x+y≥2,x+y≤ 8, x≤ $5, y \leq 5, x, y \geq 0$.

OR

Maximize & Minimize Z=20x+30y subject to the constraints x+y≥ 3, 3x+7y≤ 21, x $- y \geq 0$, x,y≥ 0.

P.T.O.

ਸਕੂਲ ਸਿੱਖਿਆ ਵਿਭਾਗ, ਪੰਜਾਬ

SUBJECT: MATHEMATICS

MODAL TEST PAPER 2018-19

Time: 3 hour **Class: ਬਾਰਵੀਂ** **M.M. 90**

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Part- A

1.1 If a binary operation defined by a*b= a^b then 2*3 is

A) 4 B) 2 C) 9 D) 8

1.2 In a single throw of two dice, the chances of throwing a sum of 5 is:

(A) 7/36 (B) 1/18 (C) 1/9 (D) 5/36

1.3 If $AB = C$ where A is a matrix of order 2×3 and C is a matrix of order 2×5, then the order of B is :

(A) 3×5 (B) 4×5 (C) 3×3 (D) 5×5

1.4 The value of $sin(sec^{-1}x + cosec^{-1}x)$ is equal to

A) 0 B) $-\frac{\pi}{2}$ C) 1 d) $\frac{\pi}{2}$

1.5 $\int e^x(\frac{1}{x} + \log x)\, dx$ equals

(A) $e^x \log x + c$ (B) $\frac{e^x}{x} + c$ (C) $-\frac{e^x}{x^2} + c$ (D) $x \log x + c$

1.6 The number of arbitrary constants in the general solution of a differential equation of third order is:

(A) 0 (B) 2 (C) 3 (D) 5

1.7 If $y = 5^x$, then $\frac{dy}{dx}$ is :

(A) 5^x (B) $5^x \log 5$ (C) $x.5^{x-1}$ (D) 0

1.8 If $\vec{a} = \hat{\imath} + 4\hat{\jmath} + 4\hat{k}$ and $\vec{b} = 4\hat{\imath} - \hat{\jmath} + 2\hat{k}$, then $\vec{a}.\vec{b}$ is equal to

(A) 8 (B) 16 (C) 12 (D) 4

1.9 Distance between two planes $2x - 3y + 6z + 14 = 0$ from point (0, 2, 1) is

(A) -2 (B) 3 (C) 2 (D) 5

1.10 If $y = \cos x$, *then* $\frac{dy}{dx}$ *at* $x = \frac{\pi}{2}$ is :

(A) 0 (B) 1 (C) -1 (D) ∞

Part-B

2. Find the differential equation of family of circles touching Y-axis at the origin.
3. Using elementary column transformations, find inverse of matrix $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$
4. Differentiate xe^x from first principle.
5. Find the shortest distance between two lines $\vec{r} = \hat{\imath} + 2\hat{\jmath} + 3\hat{k} + \lambda(\hat{\imath} - 3\hat{\jmath} + 2\hat{k})$ and $\vec{r} = 4\hat{\imath} + 5\hat{\jmath} + 6\hat{k} + \mu(2\hat{\imath} + 3\hat{\jmath} + \hat{k})$
6. Evaluate $\int x \sin^{-1}x \, dx$
7. Solve $(y + 3x^2)\frac{dx}{dy} = x$
8. Assume that each born child is equally likely to be a boy or girl. If a family has two children, then what is the conditional probability that both are girls? Given that (a) the youngest is a girl (b) at least one is a girl?
9. Evaluate $\int \frac{dx}{(x^2+1)(x^2+2)}$

Part-C

10. Show that the relation $S = \{a, b): a, b \in R \text{ and } a \leq b^3\}$ is neither reflexive nor symmetric nor transitive.

11. Using properties of determinants, prove that

$$\begin{vmatrix} a^2 & a^2-(b-c)^2 & bc \\ b^2 & b^2-(c-a)^2 & ca \\ c^2 & c^2-(a-b)^2 & ab \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)(a^2+b^2+c^2)$$

12. If $x\, sin(a+y) + sin\, a\, cos(a+y) = 0, then\ prove\ that\ \frac{dy}{dx} = \frac{sin^2(a+y)}{sin\, a}$

13. Find the interval in which $f(x) = x^4 - 8x^3 + 22x^2 - 24x + 21$ is (a) strictly increasing (b) strictly decreasing.

Or

A particle moves along the curve $y = \frac{4}{3}x^3 + 5$. Find the points on the curve at which the y-coordinate changes as fast as the x-coordinate.

14. Evaluate $\int_0^{\pi} \frac{x\, sin\, x}{1+cos^2 x}\, dx$

15. Using integration, find area of the following region $\left\{(x,y): \frac{x^2}{9} + \frac{y^2}{4} \leq 1 \leq \frac{x}{3} + \frac{y}{2}\right\}$

16. Find value of $tan^{-1}\left(\frac{x}{y}\right) - tan^{-1}\left(\frac{x-y}{x+y}\right)$

Or

$Prove\ that\ tan^{-1}\left(\frac{1}{5}\right) + tan^{-1}\left(\frac{1}{7}\right) + tan^{-1}\left(\frac{1}{3}\right) + tan^{-1}\left(\frac{1}{8}\right) = \frac{\pi}{4}$

17. Solve the differential equation $(x-y)\frac{dy}{dx} = x + 2y$

18. If $\vec{a}, \vec{b}\ and\ \vec{c}$ are three vectors, such that $|\vec{a}| = 5, |\vec{b}| = 12\ and\ |\vec{c}| = 13$ and $\vec{a} + \vec{b} + \vec{c} = 0$, then find the value of $\vec{a}.\vec{b} + \vec{b}.\vec{c} + \vec{c}.\vec{a}$

19. Two cards are drawn simultaneously (without replacement) from a well-shuffled deck of 52 cards. Find the mean and variance of number of red balls.

Part-D

20. Using matrix method, solve the following system of equations

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4,\ \ \frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1,\ \ \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2,\ \ x, y, z \neq 0$$

Or

Prove that $\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc\,(a+b+c)^3$

21. Show that the volume of the greatest cylinder that can be inscribed in a cone of height h and semi-vertical angle α is $\frac{4}{27}\pi h^3 tan^2\alpha$.

Or

An open box with a square base is to be made out of a given iron sheet of area 27 sq. m. Show that the maximum volume of the box is 13.5 cu.cm.

22. Find the equation of plane passing through the intersection of planes $2x + y - z = 3$ and $5x - 3y + 4z + 9 = 0$ and parallel to the line $\frac{x-1}{2} = \frac{y-3}{4} = \frac{z-5}{5}$

Or

Find the distance between the point P(6, 5, 9) and the plane determined by the points A(3, -1, 2), B(5, 2, 4) and C(-1, -1, 6)

23. A dealer wishes to purchase a number of fans and sewing machines. He has only Rs. 5760 to invest and has space for at most 20 items. A fan costs Rs. 360 and a sewing machine costs Rs. 240. He can sell a fan at a profit of Rs. 22 and a sewing machine at a profit of Rs. 18. Assuming that he can sell all the items that he can buy, how should he invest his money in order to maximise his profit? Formulate the problem as an LPP and solve it graphically.

Or

Graphically minimize $Z = 2x + 5y$ subject to the constraints:

$2x + 4y \leq 8, 3x + y \leq 6, x + y \leq 4$ and $x, y \geq 0$