Directorate of Education

Govt. of NCT of Delhi

Practice Test Material

2015-2016

Subject : Mathematics
Class : XI

Under the guidance of :

Addl. DE (School/Exam)

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PRACTICE TEST-1

CLASS: XI

SUBJECT: MATHEMATICS

RELATION AND FUNCTION

Time : 50 minutes **M.M. : 25**

1. Write a set of prime numbers which is a subset of {1,2,3,….30} 1

2 If A and B are two disjoint sets with n(A) = 7 and n(B) = 10, find n(A$\cup$B). 1

3. Let U = {1,2,3,….10} be the universal set and A = {1,3,5,6}, B ={3,5,7,9} are two sets, find (B–A)'. 1

4. Let A = {1,2,3,...9}, B={2,4,6,8} and C=(3,6,9}, find A–(B$\cup$C). 1

5. Two finite sets A & B have p and q elements. The total number of subsets of A&B is 144. Find the value of p+q. 4

6. Let A = {1,4,6,8,9}, B = {2,4,6,7} are two sets and V = {1,2,3,….10} be the universal set, verify De Morgan's law for A&B. 4

7. In a group of 25 people, 15 like tea, 18 like coffee and 5 like neither of the two. How many like both tea and coffee. Also find number of people who like exactly one drink. 4

8. Using properties of sets, prove the following statement. For all sets A and B, A – (A$\cap$B) = A–B.

9. From 60 players, playing cricket, football and hockey, each player has to play at least one game. 45 played cricket, 30 played football and 40 played hockey. Atmost 27 played cricket and football, atmost 32 played football and hockey and atmost 25 played cricket and hockey. Find maximum number of players that could have played all three games. How the games are helpful in enhancing the feeling of cooperation. 6

OR

In a locality of 2000 children, it was found that 40% children eat pizza, 20% children eat burger and 10% children eat sandwitch. 5% children eat pizza and burger, 3% children eat burger and sandwitch and 4% eat pizza and sandwitch. If 2% children eat all the three types of food, find the number of children.

i. eat exactly one type of food

ii. none of the food

iii. What is the impact of junk food on our health 6

PRACTICE TEST-2

CLASS: XI

SUBJECT: MATHEMATICS

RELATION AND FUNCTION

Time : 50 minutes **M.M. : 25**

1. Let A = {1,3,5}, B = {2,4,6}, C = {4,5,6,7}. Find $A \times (B \cap C)$.

2 If A = {1,2,3,…20}. R is a relation from A to A such that R = {(a,b): a=3b, a,b $\in$A}. Find range of R.

3. If n(A)=3, n(B)=4 then write n(A×A×B).

4. If $f(x) = x^3 - \frac{1}{x^3}$, find $f\left(\frac{2}{3}\right) + f\left(\frac{3}{2}\right)$.

5. If f : R→R & g : R→R, are defined by f(x) = 2x+3, $g(x)=x^2+7$. Find the value of g(f(3)).

OR

If $\left(\frac{2x}{3}+1, y-x\right) = \left(\frac{7}{3}, 5\right)$, find x & y.

6. Find the domain of $f(x) = \frac{1}{\sqrt{x - x}}$, where [x] denotes the greatest integer value of x.

OR

Find domain of $f(x) = \sqrt{\frac{(x+1)(x-3)}{x-2}}$.

7. Let f : R→R be given by $f(x) = x^2+3$. Find : (i) {x: f(x) = 28}, (ii) the pre-image of 39 and 2 under f.

8. If $f(x) = f = \frac{ax-b}{cx-a}$, then prove that f(y)=x.

9. Find domain and range of $f(x) = \frac{1}{4-x^2}$.

OR

Let $f(x) = \sqrt{x}$ and $g(x) = 3x+5$ be two functions defined in the domain $R^{+}U\{O\}$. Find :

i. (f+g) (x)

ii. $\left(\frac{f}{g}\right)(9)$

PRACTICE TEST-3

CLASS: XI

SUBJECT: MATHEMATICS

TRIGONOMETRIC FUNCTIONS

Time : 50 minutes **M.M. : 25**

1. Define radian, convert one radian into degree.
2 Evaluate cos (–870)°.
3. Find the minimum value of sin x. cos x.
4. Find the principal values of $\sqrt{3}$ at $x = -3$.
5. In a circle of diameter 42 cm, the length of a chord is 21 cm. Find the length of major arc.
6. Prove that : $\sin 5x = 5\sin x - 20\sin^3 x + 16\sin^5 x$
7. Solve for ‘x’ :

   $\cos x + \sin x = \sqrt{2}\cos A$ where $A = \dfrac{\pi}{3}$
8. Prove that in any ΔABC:

   $c^2 = (a-b)^2 \cos^2 \dfrac{c}{2} + (a+b)^2 \sin^2 \dfrac{c}{2}$
9. Prove that : $\dfrac{\sin x}{\cos 3x} + \dfrac{\sin 3x}{\cos 9x} + \dfrac{\sin 9x}{\cos 27x} = \dfrac{1}{2}(\tan 27x - \tan x)$
10. The upper part of tree broken over by the wind touching the ground in such a way that distance from the root to the point where the top of the tree touches is equal to the unbroken standing part. Using the sin c formulas, find the height of tree if the length of upper broken part is 10m. What is the role of trees in preventing the natural disaster (at least two).

PRACTICE TEST-4

CLASS: XI

SUBJECT: MATHEMATICS

PRINCIPLE OF MATHEMATICAL INDUCTION

Time : 50 minutes **M.M. : 25**

1. If P(n) be the statement n(n+1)(n+2) is divisible by 6, then what is P(3).

2 If P(n) be the statement $n^2 - n + 41$ is prime show that P(41)is not true.

3. If P(n) be the statement $n^2 > 100$ the show that P(m+1) is true whenever P(m) is true.

4. Let p be a natural number St P(n) : n+1, p+(p+1) 2x-1 is divisible by $p^2 + p + 1$ verify for p(2) is true.

5. Using PMI prove that $3.2^2 + 3^2.2^3 + 3^3.2^4 + \ldots.. + 3^n\, 2^{n+1} = \frac{12}{5}(6^n - 1) \quad \forall n \in N$

6. Using PMI prove that $11^{n+2} + 12^{2n+1}$ is divisible by 133. $\forall n \in N$

7. By using induction prove that $2n + 1 \leq 2^n$ for all natural no $n \geq 3$.

8. Using PMI prove $n^3 + (n+1)^3 + (n+2)^3$ is a multiple of 9, $\forall n \in N$

9. Using reduction prove

$$\sin x + \sin 2x + \sin 3x + \ldots. + \sin 4x = \frac{\sin\left(\frac{n+1}{2}x\right)\sin\frac{nx}{2}}{\sin\frac{x}{2}}, n \in N$$

If $Sn = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots. + \frac{1}{n} n \in N$. Prove that

$S_1 + S_2 + S_3 + \ldots. + S_n = (n+1)S_n - N$.

PRACTICE TEST-5

CLASS: XI

SUBJECT: MATHEMATICS

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Time : 50 minutes **M.M. : 25**

1. Find the real values of x and y if (x+y) – (3x+2y) I = 5+2i. 1

2 Write $\left(-2-\frac{1}{3}i\right)^3$ in the form a+ib. 1

3. If n is any integer, then find the value of $\frac{i^{4n+1}-i^{4n-1}}{2}$. 1

4. Write the conjugate of $(3-4i)(-5+12i)$. 1

5. Find the real values of x and y if : 4

$(3x-2iy)(2+i)^2=10(1+i)$

6. If $z=x+iy$ and $|2z+1|=|z-2i|$, then show that $3(n^2+y^2)+y(n+y)=3$. 4

7. Convert $\frac{1+7i}{(2-i)^2}$ into polar form. 4

8. Find square root of $-2+2\sqrt{-3}$. 4

9. If α and β are different complex numbers with $|\beta|$ = 1, then find $\left|\frac{\beta-\alpha}{1-\alpha\beta}\right|$. 6

10. Solve $2x^2-(3+7i)x+(9i-3)=0$, by using formula for a quadratic equation.6

PRACTICE TEST-6

CLASS: XI

SUBJECT: MATHEMATICS

COMPLEX NUMBERS AND QUADRATIC EQUATIONS

Time : 50 minutes **M.M. : 25**

1. Express the following complex numbers in standard form a + ib :

   a) $(-5+3i)^2$

   b) $(1+i)^6 + (1-i)^3$

2 If $\frac{(1+i)^2}{2-i} = x + iy$, then find the value of x+y.

3. Find conjugate and modulus of $z = \frac{3+\sqrt{-1}}{2-\sqrt{-1}}$.

4. Find the real numbers x and y if (x+iy) (2–3i) = 4+i.

5. If z = cos θ + i sin θ, then prove that

   $\frac{1+z}{1-z} = i\cot\frac{\theta}{2}$

6. Find the square root of $-1+2\sqrt{2}\ i$

7. If 1–i is a root of the equation $x^2 + ax + b = 0$, where a, b $\in$R, then find the values of a and b.

8. Write the following complex numbers in polar form :

   i. $\frac{-16}{1+i\sqrt{3}}$

   ii. $\frac{i-1}{\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}}$

9. If $(x+iy)^{1/3} = a+ib$, where x, y, a, b $\in$R, then show $\frac{x}{a} - \frac{y}{b} = -2(a^2+b^2)$

10. Solve the quadratic equation :

    $x^2 - (2\sqrt{5}+3i)x + 6\sqrt{5}\ i = 0$

PRACTICE TEST-7

CLASS: XI

SUBJECT: MATHEMATICS

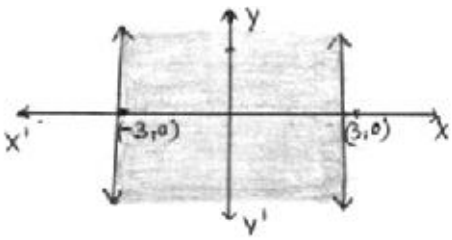
LINEAR INEQUALITIES

Time : 50 minutes **M.M. : 25**

1. Solve the inequality graphically : $|x-y|>1$

2 Solve $(3x+7) \leq 2(1-x)$ and represent its solution on number line.

3. Write the inequality for the following graph:



4. Solve : $\dfrac{x+1}{x+2} \geq 1$

5. Solve $7x-5<3x+3$ when:

   (i) $x \in R$ (ii) $x \in N$ (iii) $x \in Z$ (iv) $x \in Z^{+}$

6. Solve: $\dfrac{|x+3|-2}{x+2} > 0$

7. Solve the following system of equations in R $5x-7<3(x+3), 1-\dfrac{3x}{2} \geq x-4$

8. A company manufacturers cassettes and its cost and revenue functions for a week are $C = 300 + \dfrac{3}{2}x$ and R = 2x, where x is the number of cassettes produced and sold in a week. How many cassettes must be sold for the company to realize a profit?

9. Solve the following system of inequalities graphically :

   $x+y \geq 1, \ 7x+9y \leq 63, \ x \leq 6, \ y \leq 5, \ x \geq 0, \ y \geq 0$

10. The water acidity in a pool is considered normal when the average pH reading of three daily measurements is between 7.2 and 7.8. If the first two pH reading are 7.48 and 7.85. Find the range of pH value for the third reading that will result in the acidity level being normal.

PRACTICE TEST-8

CLASS: XI

SUBJECT: MATHEMATICS

LINEAR INEQUALITIES

Time : 50 minutes **M.M. : 25**

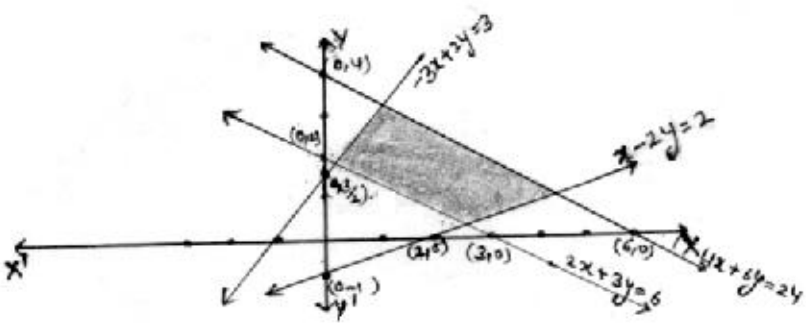
1. Solve $\frac{|x-2|}{x-2} \geq 0$

2 Write the solution set of $\left|x+\frac{1}{x}\right| > 2$

3. Write the solution set of values of x satisfying the inequation $(x^2-2x+1)(x-4) \geq 0$.

4. represent the linear inequality |x|<5 on number line.

5. Find the linear inequalities for which the shaded area is the solution set.



6. To receive grade 'A1' in a course, one must obtain an average of 90 marks or more in five papers each of 100 marks. If RITU scored 87, 95, 92, and 94 marks in first four papers. Find the minimum marks that she must score in the last paper to get grade 'A1' in the course. According to you, which of the evaluation system – marks or grade is better.

7. Solve $\frac{4x-4}{3} \leq 2x-4$

$$\frac{2x+21}{4} \geq \frac{4x+6}{3}$$

OR

Solve the system of inequations:

$$\frac{|x|-1}{|x|-2} \geq 0, \; x \in R, \; x \neq \pm 2$$

8. A manufacturer has 600 litres of a 12% solution of acid. How many litres of a 30% acid solution must be added to it, so that acid content in the resulting mixtures will be more than 15% but less than 18%.

OR

Solve the following system of linear inequalities graphically :

$$2x+3y \leq 12, \; x+2y \geq -4, \; x+4 \leq 0, \; -x+4y \leq 4, \; x \geq 0, \; y \leq 0$$

PRACTICE TEST-9

CLASS: XI

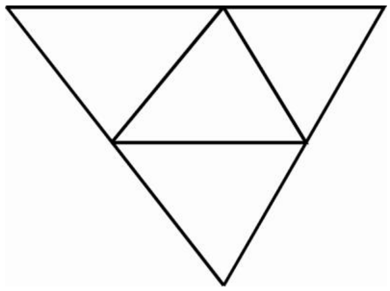
SUBJECT: MATHEMATICS

PERMUTATION AND COMBINATION

Time : 50 minutes **M.M. : 25**

Short answer type (one mark each)

1. In a class 18 boys and 17 girls, the teacher want to select one boys and one girl to represent class for a function. In how many ways can the teacher made this selection, if a head boys and a head girl are already selected from this class.
2. Find the ratio of HCF and LCM of $\underline{|5}$, $\underline{|6}$, and $\underline{|7}$.
3. How many numbers are there between 99 and 1000 having 9 in the unit place.
4. In how many ways can this diagram be coloured subject to following conditions:
   a. each of the smaller triangle is to be painted with one of three colours red or green or blue
   b. no two adjacent regions have the same colour.



Long answer type (4 marks each)

5. Three married couples are to be seated in a row in a cinema hall having six seats such that spouses are to be seated next to each other :
   a) In how many ways they can be seated
   b) Find also the number of ways of their seating if all the ladies sit together
6. In a competitive exam 5 students appear for mathematical aptitude test and 6 students appear for other subjects aptitude. Find the number of ways they can be seated in a row such that no two mathematics students sit together for test.
7. A box contains two white, three black and four red balls. In how many ways can three balls be drawn from the box, if atleast one black ball is to be included in the draw.
8. $^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7$
9. Find the number of ways of dividing 15 prizes into three groups consisting of 8,4 and 3 participants respectively.

Very long type (6 marks)

10. A man has eight relatives 4 of them are ladies and 4 of them are gents. His wife has 8 relatives of 4 them are ladies and 4 of them are gents. In how many ways can they invite a dinner party of 4 ladies and 4 gents so that 4 are men's relative and 4 are of wife's relatives.

PRACTICE TEST-10

CLASS: XI

SUBJECT: MATHEMATICS

BINOMIAL THEOREM (CHAPTER 8)

Time : 50 minutes **M.M. : 25**

Very short answer type (one mark each)

1. Find the coefficient of x^{-3} in the expansion of $\left(2x^2+\frac{1}{X}\right)^{12}$.

2. Find the middle term of : $\left(\frac{a}{3}+2b\right)^8$

3. Determine whether the expansion $\left(x^2-\frac{2}{x}\right)^{18}$

   Will contain a term x^{10}.

4. Find the third term from the end of the expansion of $(2x+3y)^8$.

Long answer type (4 marks each)

5. Find the term independent of x in the expansion : $(1+2x+3x^3)\left(\frac{3}{2}x^2-\frac{1}{3x}\right)^9$.

6. Show that $2^{4x+4}-15x-16$ where $n\in N$ is divisible by 225.

7. Find the value of K so that the term is $\left(5x+\frac{K}{x^2}\right)^{10}$, independent of x is 405.

8. If the coefficient of 2^{nd}, 3^{rd} and 4^{th} term in the expansion of $(1+x)^{2n}$ and in AP. Show that $2x^2 - 9x + 7 = 0$.

Long answer type (6 marks)

9. If the coefficient of 3^{rd}, 4^{th} and 5^{th} and 6^{th} terms in the expansion of $(x+y)^n$ be a, b, c and d respectively. Prove : $\frac{b^2-ac}{c^2-bd}=\frac{5a}{3c}$

   OR

   Find numerically the greatest term in the expansion :

   $(2+3x)^9$ where $x=\frac{3}{2}$

PRACTICE TEST-11

CLASS: XI

SUBJECT: MATHEMATICS

SEQUENCES AND SEREIS

Time : 50 minutes **M.M. : 25**

1. How many numbers of two digits are divisible by 7?
2. If the sum of n terms of A.P. is given by $S_n = 3n + 2n^2$, then find the common difference of the A.P.
3. Sum the following series to infinity :

   $$\left(\sqrt{2}+1\right) + (1) + \left(\sqrt{2}-1\right) + ...\infty$$

4. Find the minimum value of $9^x + 9^{1-x},\ x \in IR$.
5. One side of an equilateral triangle is 18cm. The mid points of its sides are joined to form another triangle whose mid points, in turn are joined to form still another triangle. The process is continued indefinitely. Find the sum of the :

   i) perimeters of all the triangles

   ii) area of all the triangles
6. If f is the function satisfying f(x+y) = f(x) f(y) for all x, y $\in$ IN such that f(1) = 3 and $\sum_{x=1}^{x} f(x) = 120$, find n.
7. Two cars start together in the same direction from the same place. The first goes with uniform speed of 40km/hr. The second goes at a speed of 32 km/hr in the 1st hour and increases the speed by 2 km/hr each succeeding hour. After how many hours will the second car overtake the first car if both cars go non-stop. What are the harmful effects of over speeding?
8. Find the sum to n terms of the series.

   $$\frac{1}{1+1^2+1^4} + \frac{2}{1+2^2+2^4} + \frac{3}{1+3^2+3^4} + ...$$

   OR

   Find the sum to n terms of the series:

   3+15+35+63+…..
9. After striking a floor a certain ball rebounds (4/5)th of the height from which it has fallen. Find the total distance that it travels before coming to rest, if it is gently dropped from a height of 120m.

   OR

   If a, b, c are in A.P. then show that :

   i. $a^2(b+c), b^2(c+a), c^2(a+b)$ are in A.P.

   ii. $(b+c)^2 - a^2, (c+a)^2 - b^2 (a+b)^2 - c^2$ are in A.P.

PRACTICE TEST-12

CLASS: XI

SUBJECT: MATHEMATICS

THE STRAIGHT LINES

Time : 50 minutes **M.M. : 25**

1. Find the equation of straight line which passes through the point A (3,4) and such that its intercept between the axes is bisected at A.
2. The vertices of a triangle are (6,0), (0,6) & (6,6). Find the distance between its circumcentre and centroid.
3. Find the area of the triangle formed by line ax+by+c=0 with her coordinate axes if a, b are in G.P.
4. Show that the tangent angle between the lines $\frac{x}{a}+\frac{y}{b}=1$ & $\frac{x}{a}-\frac{y}{b}=1$ is $\frac{2ab}{a^2-b^2}$.
5. Find the coordinates of the image of point (2, –7) in the line 3x–4y+1=0.
6. If the median from the points A & B of a triangle A (0,b), B(0,0), C(a,0) are mutually perpendicular. Find the relation between a & b.
7. If the line joining the two points A(2,0) & B(3,1) is rotated about A in anti-clockwise direction through an angle of 15°. Find the equation of the line in new position.
8. Prove that the equation to the straight line passing through the point $(a\cos^3\theta, a\sin^3\theta)$ and are perpendicular to the line $x\sec\theta + y\,\mathrm{cosec}\theta = a$ is $x\cos\theta - y\sin\theta = a\cos^2\theta$.
9. Find the coordinates of the points on the line x+y=4 which are at a unit distance from the line 4x+3y=10.
10. Show that the path of the mid points of the distance between the axes of the variable line x cos α + y sin α = p is $\frac{1}{x^2}+\frac{1}{y^2}=\frac{4}{p^2}$.

OR

If the slope of a line passing through the points A(3,2) is $\frac{3}{4}$ then find the points on the line which are 5 unit away from the point A.

PRACTICE TEST-13

CLASS: XI

SUBJECT: MATHEMATICS

CONIC SECTIONS

Time : 50 minutes **M.M. : 25**

1. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2=12y$ to the ends of the latus rectum.
2. Find the equation of the circle in the first quadrant touching each coordinates axes at a distance of one unit from the (0,0).
3. If the line $y=\sqrt{3}x+k$ touches the circle $x^2+y^2=16$, then find k.
4. Find the eccentricity of an ellipse whose foci are (±5,0) and $x=\frac{36}{5}$ as one of its directrices.
5. Find the equation of a circle of radius 5 which is touching another circle $x^2+y^2-2x-4y-20=0$ at (5,5).
6. Show that this equation :

   $x^2+4y^2+2x+16y+13=0$ represents on ellipse, also find eccentricity, vertices, focii, length of major and minor axes, latus rectum?
7. Find the equation of the circle having centre (1,–2) and passing through the point of intersection of the lines 3x+y=14 and 2x+5=18.
8. Prove that the points (1,2), (3,–4), (5, –6), (11, –8) are concyclic.
9. If y = 2x is a chord of the circle $x^2 + y^2 - 10x = 0$, find the equation of the circle with this chord as diameter?
10. If e_1 and e_2 are the eccentricities of the ellipse $\frac{x^2}{18}+\frac{y^2}{4}=1$ and the hyperbola $\frac{x^2}{9}-\frac{y^2}{4}=1$. Write the value of $2e_1^2+e_2^2$?

    OR

    If the lines 2x–3y=5 and 3x–4y=7 are the diameters of the circle of area 154 sq. units, then obtain the equation of a circle.

PRACTICE TEST-14

CLASS: XI

SUBJECT: MATHEMATICS

LIMITS AND DERIVATIVES

Time : 50 minutes **M.M. : 25**

1. Evaluate :

$$\lim_{x\to\infty}\frac{(x+1)^{10}+(x+2)^{10}+.....+(x+100)^{10}}{x^{10}+10^{10}}$$

2. Find : $\mathop{Lt}\limits_{x\to 0}\frac{|\sin x|}{x}$

3. $\mathop{Lt}\limits_{x\to -3}\frac{x^3+27}{x^5+243}$

4. If f(x) = x sin x, then obtain $f'\left(\frac{\pi}{2}\right)$.

5. Evaluate $\mathop{Lt}\limits_{x\to a}\frac{\sqrt{a+2x}-\sqrt{3x}}{\sqrt{3a+x}-2\sqrt{x}}; a\neq 0$

6. Evaluate $\mathop{Lt}\limits_{h\to 0}\frac{(a+h)^2\sin(a+h)-a^2\sin a}{h}$

7. If $f(x)=\begin{cases}\frac{x-|x|}{2} & , \quad x\neq 0\\ 2 & , \quad x=0\end{cases}$

   Show that $\lim\limits_{x\to 0} f(x)$ doesn't exist.

   OR

   If $f(x)=\begin{cases}\frac{\sin[x]}{[x]} & , \quad [x]\neq 0\\ 0 & , \quad [x]=0\end{cases}$

   Show that $\lim\limits_{x\to 0} f(x)$ doesn't exist.

8. If $\lim\limits_{x\to 1}\frac{x^4-1}{x-1}=\lim\limits_{x\to k}\frac{x^3-k^3}{x^2-k^2}$, then find the value of k.

9. If $y=\sqrt{\frac{x}{a}}+\sqrt{\frac{a}{x}}$, prove that $2xy\frac{dy}{dx}=\frac{x}{a}-\frac{a}{x}$.

10. Differentiate y = f(x) = $\sqrt{\sin x}$ using first principle.

    OR

    Differentiate $y=f(x)=x^2\tan x$ using first principle.

PRACTICE TEST-15

CLASS: XI

SUBJECT: MATHEMATICS

STATISTICS

Time : 50 minutes **M.M. : 25**

1. In a test with maximum score 25, eleven students scored 3, 9, 5, 3, 12, 10, 17, 4, 7, 19, 21 marks respectively. Calculate range.
2. The following data relates to the goods produced in a factory. Find the mean and standard deviation of the daily output of the articles produced:

No.of workers	18	19	20	21	22	23	24	25	26	27
No.of workers	3	7	11	14	18	17	13	8	5	4

3. Find mean and variance of the following data:

Classes	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Frequency	20	24	32	28	20	11	26	15	24

4. For two factories A and B, we have the following data:

	Factory A	Factory B
No. of wage earners	50	100
Average monthly wages (Rs.)	1200	850
Standard deviation (Rs.)	9	16

   i. Which factory has higher salary bill?
   ii. Which has greater variability in wages distribution?

5. While calculating the mean and variance of 10(ten) observations, a student wrongly uses the observation 52 for the correct observation 25. He obtained the mean and variance as 45 and 16 respectively. Find the correct mean and variance.
6. The mean and standard deviation of 25 observations are 60 and 3. Later on it was decided to omit an observation which was incorrectly recorded as 50. Calculate the mean and standard deviation of the remaining 24 observations.
7. Find the mean deviation about the median for the following data:

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	4	5	3	6	2

8. The scores of 10 students in a test with maximum marks 50 were as follows:
   28, 36, 34, 28, 48, 22, 35, 27, 19, 41
   i. Find variance
   ii. If two grace marks are awarded to each student, what is the new variance?
   iii. If instead, 5 marks are deducted from each students marks due to complaint of mass copying, what would be the new variance?
   iv. If instead, the marks are to be calculated out of 100 and so the marks of each student are doubled, what would be the new variance?

PRACTICE TEST-16

CLASS: XI

SUBJECT: MATHEMATICS

INTRODUCTION TO 3-DIMENSIONAL GEOMETRY

Time : 50 minutes **M.M. : 25**

1. Find the (mirror) image of the given point in specified plane (–3,4,7) in the yz plane.
2. If a point lies in the yz plane, then what can you say about its x-coordinate?
3. Find the distance between the point (–3,4,–6) and its image in the xy plane.
4. Determine the point in zx-plane which is equidistant from the points (1,–1,0), (2,1,2), (3,2,–1).
5. If a point C is y coordinate 2 lies on the line joining the points A(–1,–4,5) and B(4,6,–5), find its coordinates.
6. In what ratio is the line segment joining the points (2,4,5) and (3,5,–4) divided zx-plane.
7. Find the coordinate of the point R which divides the join of P(O,O,O) and Q(4,–1,–2) in the ratio 1:2 externally and verify that P is mid-point of segment RQ.
8. If three consecutive vertices of a parallelogram ABCD are A(1,2,3), B(–1,–2,–1) and C(2,3,2), then find the fourth vertex.
9. If the points A(1,0,–6), B(–3, p,q) and C(–5,9,6) are collinear, find the values of p and q.
10. Show that the three points A (2,3,4), B (–1,2,–3) and C(–4,1,–10) are collinear. Also find the ratio in which C divides the segment AB.

PRACTICE TEST-17

CLASS: XI

SUBJECT: MATHEMATICS

PROBABILITY

Time : 50 minutes **M.M. : 25**

1. The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then what is the probability of neither A nor B?

2. Six new employees, two of whom are married to each other, are to be assigned six desks that are lined up in a row. If the assignment of employees to desks is made randomly, what is the probability that the married couple will have non-adjacent desks?

3. Three numbers are chosen from 1 to 20. Find the probability that they are not consecutive.

4. The probability that atleast one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then find $P(\bar{A}) + P(\bar{B})$.

5. A bag contains 8 red and 5 white balls. Three balls are drawn at random. Find the probability that :
   a. All the three balls are white
   b. All the three balls are red
   c. One ball is red and two balls are white

6. If the letters of the word ASSASSINATION are arranged at random. Find the probability that :
   a. Four S's come consecutively in the word
   b. Two I's and two N's come together
   c. All A's are not coming together
   d. No two A's are coming together

7. A card is drawn from an ordinary pack of 52 cards and a gambler bets that, it is a spade or an ace. What are the odds against his winning this bet?

8. A die is loaded in such a way that each odd number is twice as likely to occur as each even number. Find P(G), where G is the event that a number greater than 3 occurs on a single roll of the die.

9. Find the probability that the birthdays of six different persons will fall in exactly two calendar months.