MATHEMATICS **2017**

Time: 30 minutes **Max Marks: 20**

SECTION "A" (MULTIPLE CHOICE QUESTIONS)

1. Choose the correct answers for each from the given options:

1. The natural logarithm has the base:
- **a)** π
- **b)** e
- **c)** 10
- **d)** None of these

2. {2,3,5,7 --------} is the set of of:
- **a)** Prime number
- **b)** Whole number
- **c)** Natural number
- **d)** Even number

3. $\frac{a}{\sqrt{a}} = ---$
- **a)** a
- **b)** $\frac{1}{\sqrt{a}}$
- **c)** √a
- **d)** a^2

4. The Cartesian product of set A and B is written as:
- **a)** A.B
- **b)** A x B
- **c)** A Δ B
- **d)** B x A

5. If x = 1 and Y=1, then value of x - y + xy will be:
- **a)** 1
- **b)** 0
- **c)** 2
- **d)** -1

6. The sum of the supplementary angles is:
- **a)** 90°
- **b)** 180°
- **c)** 360°
- **d)** None of these

7. X4 + 64 will be a perfect square by adding:
- **a)** 16
- **b)** $16x^4$
- **c)** $16x^2$

d) 8

8. The duplicate ratio of 2a : 3b is:

a) $4a^2 : 9b^2$

b) $8a^3 : 27b^3$

c) $\sqrt{2a} : \sqrt{3b}$

d) None of these

9. If ∑D= 125, A = 25 and n= 5, then ẍ is:

a) 50

b) 100

c) 150

d) None of these

10. $\sqrt{1 - sin^2}\,\theta =$

a) cos θ

b) tan θ

c) sec θ

d) sin θ

11. The value which appears the most often in a set of data is called:

a) Range

b) Mode

c) Mean

d) Median

12. The angle inscribed in a major arc is:

a) Acute

b) Obtuse

c) Right

d) None of these

13. a:b :: b:c then b is called:

a) 1st proportion

b) Mean proportion

c) 4th proportion

d) None of these

14. 4 x 5° =

a) 4

b) 5

c) 20

d) 0

15. $\sqrt[5]{43}$, 5 is called:

a) Index

b) Radicand

c) Exponent

d) None of these

16. The point through which medians of a triangle pass is called:

a) Orthocenter
b) Centroid
c) Circum centre
d) In centre

17. The multiplicative inverse of a – b is:

a) a + b
b) –a + b
c) $\frac{1}{a-b}$
d) $\frac{1}{a+b}$

18. (√2 + 1) (√2 -1) =

a) 2
b) 0
c) 1
d) √2

19. The degree of polynomial x2 + xy2 +y is:

a) 2
b) 3
c) 4
d) 1

20. The characteristics of 0.08595 is:

a) 2 **b)** $\bar{2}$ **c)** 1 **d)** $\bar{1}$

MATHEMATICS 2017

Time: 2.5 hours Max Marks: 60

SECTION "B" (SHORT ANSWER QUESTIONS) (36)

NOTE: attempt 9 questions from this section.

2. If A = { 1,2,3,4 } and B = { 2,4,6,8 }, prove that (A U B) = (A ∩ B) U (B Δ A).

3. Simplify $(\frac{x^a}{a^b})^{a+b}$ x $(\frac{x^b}{x^c})^{b+c}$ x $(\frac{x^c}{x^a})^{c+a}$

4. If x= 2 + √3, then find the value of $x^2 + \frac{1}{x^2}$

5. Find the value of $x^2 + y^2 + z^2$ when x + y +z = √ 7 and xy + yz +zx = 2

6. Find the value of $\frac{85.7\ x\ 2.47}{8.89}$ with the help of logrithmetic table

7. Resolve into factors: x^2 **(y-z) +** y^2 **(z-x) +** z^2 **(x-y)**

8. If two angles of a triangle are congruent, prove that the sides opposite to them are also congruent.

9. For what value of "q" $4x^4 + 12x^3 + 25x^2 + 24x + q$ will be a perfect square?

10. Eliminate x from the following equation:

$$x + \frac{1}{x} = 2p, x - \frac{1}{x} = 2q + 1$$

11. Solve the equation x2 – x – 56 = 0 by using quadratic formula.

12. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, prove that ($a^2 + c^2 + e^2$) ($b^2 + d^2 + f^2$) = (ab + cd + ef)^2
13. If a perpendicular is drawn from the centre to a chord of a circle, it bisects the chord. Prove.
14. Find all the trigonometric ratios of 30°.
15. If A = $\begin{matrix} 3 & 2 \\ 1 & 0 \end{matrix}$ then find A^{-1} and verify that $A.A^{-1} = 1$
16. Prove that $\frac{1-sin\theta}{Cos\theta} = \frac{Cos\theta}{1+Sin\theta}$

SECTION C (DETAILED-ANSWER QUESTION) (24)

NOTE: Attempt 3 questions from this section including the compulsory question No. 19.

17. Factorize the following:
    - **a)** $6a^2 - 11a$ - 10
    - **b)** $a^3 - a^2 + 2$
    - **c)** $a^3 + 8b^3 + 27c^3 + 18abc$
    - **d)** $4a^4 + 625b^4$
18. Find the solution set of the following equations graphically: (find four ordered pairs for each equation)

    X – 2y = -3
    2x + y = 14

19. In the correspondence of two triangles, if three sides of one triangle are congruent to the corresponding three sides of the other, the two triangles are congruent. Prove it.
20. Find the variance of the following set of observations:

    X = 11, 13, 25, 15, 12, 18, 17, 23, 20, 16

    (b) Find the factors by means of reminder theorem:

    $x^3 + 7x^2 + 14x + 8$

21. Construct the triangle ABC in which m $\overline{AB}$ = 4cm, m $\overline{BC}$ = 5cm, and m <B = 60°. Draw the circum circle of the triangle and write the steps of construction

MATHEMATICS 2016

Time: 30 minutes Max Marks: 20

SECTION "A" (MULTIPLE CHOICE QUESTIONS)

1. Choose the correct answer for each of the given options:

1. { 0, 1, 2, 3 ---} is the set of:
- **a)** Natural number
- **b)** Whole number
- **c)** Prime number
- **d)** Even number

2. (√x + √y)(√x-√y) =
- **a)** x-y
- **b)** x^2-y^2
- **c)** √x - √y
- **d)** √x + √y

3. The measure of an angle inscribed in a semi circle is equal to:
- **a)** 90°
- **b)** 180°
- **c)** 30°
- **d)** 60°

4. If a + b = 2 and a – b = 2, then the value of $a^2 + b^2$ =
- **a)** 2
- **b)** 3/2
- **c)** -1
- **d)** 4

5. It should be added to $x^2 + \frac{4}{1/x^2}$ to make it perfect square.
- **a)** xy
- **b)** x^2y^2
- **c)** $2xy$
- **d)** 2

6. The H.C.F of $8x^3y^2$ and $12x^2y$ is:
- **a)** $4x^2y$
- **b)** $96x^3y^2$
- **c)** $12x^2y$
- **d)** None of these

7. A circle which passes through all the three vertices of a triangle is called the:
- **a)** Circumscribed circle

b) Circum centre
c) Circum radius
d) Inscribed circle

8. The multiplicative inverse of $\frac{1}{a+b}$ is:

a) $\frac{-1}{a+b}$
b) $a+b$
c) a-b
d) none of these

9. $[\,-1\,(\,-1)^5]^\circ$ =

a) 0
b) 1
c) -1
d) 2

10. An angle measuring greater than 90° is called:

a) Acute
b) Congruent
c) Obtuse
d) Right

11. A triangle having no sides congruent is called:

a) Equilateral
b) Acute angled
c) Obtuse angled
d) Scalene

12. If $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$, then ad-bc is called:

a) Singular matrix
b) Scalar matrix
c) Determinant matrix
d) Zero matrix

13. If two circles of radii 5cm and 3cm touch externally then the distance between their centers will be:

a) 2cm
b) 8cm
c) 15cm
d) 4cm

a) Cos 45o = √2
b) $\frac{1}{\sqrt{2}}$
c) $\frac{1}{2}$
d) None of these

14. The characteristic of 8595 is:

a) 2
b) 3
c) 4
d) 1

15. The natural logarithm has the base:

a) π
b) 10
c) e
d) 0

16. The sub duplicate ratio of 49.25 is:

a) 7:5
b) 49:5
c) 7:25
d) None of these

17. If ∑ D= 125, A = 25 and a= 5 then $\bar{X}$ is:

a) 50
b) 60
c) 70
d) None of these

18. In an equlateral triangle, each angle is of:

a) 30°
b) 45°
c) 90°
d) 60°

MATHEMATICS 2016

Time: 2.5 hours Max Marks: 60

SECTION "B" (SHORT ANSWER QUESTIONS) (36)

NOTE: attempt 9 questions from this section.

2. If A = { 1,2,3,4 } and B = { 2,4,6,8 }, prove that (A Δ B) = (A - B) U (B - A).
3. Simplify $(\frac{x^a}{a^b})^{a+b}$ x $(\frac{x^b}{x^c})^{b+c}$ x $(\frac{x^c}{x^a})^{c+a}$
4. Find the value of $\frac{(6.735)x\ (48.27)}{(16.18)^2}$ with the help of logrithmetic table.
5. Find the value of $x - y$ when x + y = -9 and xy = 20
6. For what values p and q

$4a^2 + 12a^3 + 25a^2 + pa + q$ Will be perfect square?

7. Find the solution set of $\sqrt{25-6} = \sqrt[4]{y+3}$

8. Solve the following equation by crammer's rule:
   8x-4y = 2, x+ 2y =4

9. Eliminate y from the following equation:

   $$x + \frac{1}{y} = 2a, y - \frac{1}{y} = 2b + 1$$

10. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, prove that $\frac{a^4b^2+a^2e^2-e^4f}{b^6+b^2f^2-f^5} = \frac{a^4}{b^4}$

11. If two angles of triangle are congruent, prove that the angle opposite to them is also congruent. Prove it

12. The sum of the measures of three angles of a triangle is 180°. Prove it.

13. The measure of the central angle of a minor arc of a circle is double that of the inscribed angle of the corresponding major arc. Prove it.

14. Find the value of trigonometric ratios of an angle of 45°.

15. Resolve into factors: a^2 (b - c) + b^2 (c - a) + c^2 (a – b)

16. Derive that $Sin^2\theta + Cos^2\theta$ = **1**

SECTION C (DETAILED-ANSWER QUESTION) (24)

NOTE: Attempt 3 questions from this section including the compulsory question No. 19.

17. Factorize the following:
    a) $x^2 - 15x$ - 100
    b) $a^4 - 4b^4$
    c) $a^3 + a^2 + 2$
    d) $64y^6 + \frac{64}{y^6}$ - $8y^9$ + $96y^3$

18. Find the solution set of the following equations graphically: (find four ordered pairs for each equation)

    3x – 11 = y and x – 3y = 9

19. In a correspondence of two right triangles, if their hypotenuses are congruent and one more side of one triangle is congruent to the corresponding side of the other, the two triangles are congruent. Prove it.

(A) The marks obtained by 84 students in an examination are given below. Find the mean:

MARKS	25 -29	30 – 34	35 – 39	40 – 44	45 - 49
STUDENTS	9	18	35	17	5

(B) Factors with the help of reminder theorem.

$$x^3 + 3x^2 + 4x - 28$$

20. Construct a triangle ABC in which m $\overline{AB}$ = 5cm, m < B = 105° and m $\overline{BC}$ = 4cm. draw it circumscribed circle. Also write the steps of construction.

MATHEMATICS **2015**

Time: 30 minutes **Max Marks: 20**

SECTION "A" (MULTIPLE CHOICE QUESTIONS)

1. Choose the correct answer for each from the given options.

1. The central angle of minor arc is _____ than the inscribed angle of its corresponding major arc:

- **a)** Less
- **b)** Double
- **c)** Half
- **d)** None of these

2. The shortcut formula of arithmetic mean is:

- **a)** $\frac{\sum x}{n}$
- **b)** $A + \frac{\sum fD}{\sum f}$
- **c)** $\frac{n+1}{2}$
- **d)** $\frac{\sum fx}{n}$

3. The reciprocal of cotθ is:

- **a)** $\frac{1}{Cos\theta}$
- **b)** Tanθ
- **c)** $\frac{1}{-tan\theta}$
- **d)** None of these

4. The set of first three prime numbers is:

- **a)** {1,2,3}
- **b)** {2,3,5)

c) {1,3,5}
d) {2,3,7}

5. If √x , y = 9 then x = _____
a) 3
b) ±3
c) 81
d) ½

6. $\sqrt[y]{x,y}$ is called the _____ of the root:

a) Radical
b) Quantity
c) Index
d) None of these

7. 1 + $cot^2\theta$ = _____
a) $cosec^2\theta$
b) $tan^2\theta$
c) $sec^2\theta$
d) $cos^2\theta$

8. If log7 x = 2 the value of x is:
a) $x^2 = 7$
b) $2^x = 7$
c) $2^7 = x$
d) $7^2 = x$

9. The third proportion to 6 and 18 is:
a) 12
b) +54
c) 36
d) 324

10. The square root of $(a – b)^2$ is:
a) ± (a – b)
b) ± (a – b) (a – b)
c) ± (a + b)
d) None of these

11. A set which contains all the sets under the consideration is:
a) Universal
b) Null
c) Sub
d) None of these

12. The set A = { 2,3,5,7,11 ----- } is closed with respect to:

a) Addition
b) Multiplication
c) Division
d) None of these

13. Triangle have no sides congruent is called---- triangle
a) Right
b) Obtuse
c) Isosceles
d) Scalene

14. If (x + 2, 3y – 6) = (2x, y), then x = _____
a) 4
b) 2
c) 6
d) None of these

15. If a, b, c are in continued proportion , then:
a) ab = c^2
b) a^2 = bc
c) $ac = b^2$
d) None of these

16. Line segment joining the vertex to the midpoint of the opposite side of a triangle is called:
a) Altitude
b) Centroid
c) Median
d) None of these

17. (9 – 3) is in _____ quadrant / axis:
a) 1^{st}
b) 4^{th}
c) X
d) Y

18. The scientific notation of 756837 is:
a) 7.56837 x 10^5
b) 7.56837 x 10^{-5}
c) 7.56837 x 10^{-4}
d) None of these

19. If $\bar{x}$ – 6, n = 5, then $\sum x$ = _____
a) 1.5
b) 1.2
c) 30
d) 11

20. Cosec (90° - 30°) = Sec _____

a) 30°
b) 60°
c) 90°
d) None of these

MATHEMATICS 2015

Time: 2.5 hours Max Marks: 80

SECTION "B" (SHORT ANSWER QUESTIONS)

NOTE: attempt 10 questions from this section.

2. If A = {a, b, c) and B = {x, y} find only two binary relation in A x B.
3. $\frac{\sqrt{(216)^{\frac{2}{3}}(25)^{1/2}}}{(1/25)^{-3/2}}$
4. With the help of logarithmic table find the value of

$$\frac{\sqrt{431.5\,x} + (1.2)^2}{\sqrt[3]{36.98}}$$

5. Find the value of $a^3 + b^3 + c^3$ - 3abc when a + b +c = 15 and abc + bc +ca = 74
6. Resolve the factors:

$4a^2$ (3b -4c) + $9b^2$ ($4c - 2a$) + $16c^2$ ($2a - 3b$)

7. Find the solution set of the following:

-6 + | 5x – 3 | = 3

8. If A = $\begin{vmatrix} 3 & 2 \\ 5 & 4 \end{vmatrix}$ find the A^{-1} and verify that $A.A^{-1} = 1$
9. If a side of a triangle is extended the exterior angle so formed is, in measure, greater than either of the two interior opposite angles. Prove it.
10. Eliminate "a" from the following equation:

$$a^2 + \frac{1}{a^2} = m^2, a^4 \frac{1}{a^4} = b^4$$

11. Congruent chords of a circle (or congruent circles) are equidistant from its (or their) centre (s). Prove it.
12. If in θ = 3/5, find the remaining trigonometric ratios, using trigonometric identities.
13. The line segment, joining the midpoints of two sides of a triangle parallel is to the third side and half as long. Prove it.

14. What should be added to $x^4 + 4x^3 + 10x^2 + 5$ so that it may be perfect square?

15. If $\frac{x}{a} = \frac{y}{b} = \frac{z}{c}$, prove that $\frac{x^3}{a^2} + \frac{y^3}{b^2} + \frac{z^3}{c^2} = \frac{(x+y\,z)^3}{(a,b,c)^2}$
16. find the solution set of the following in-equation:

$\frac{x+5}{10} < \frac{25-4x}{5}$, ^{a} x $^{\varepsilon}$ n

SECTION C (DETAILED-ANSWER QUESTION)

NOTE: Attempt 3 questions from this section including the compulsory question No. 19. (30)

17. Factorize the following:
    - **e)** $(x - 2y)^3 - 64z^3$
    - **f)** $4a^4 + 625b^4$
    - **g)** $x^2 + 15x + 36$
    - **h)** ax^4 - $\frac{a}{16}$

18. Find the solution set of the following equations graphically: (find four ordered pairs for each equation)

    3x – 11 = y and x – 3y = 9

19. In a correspondence of two right triangles, if their hypotenuses are congruent and one more side of one triangle is congruent to the corresponding side of the other, the two triangles are congruent. Prove it.

    3 (a) a set of data contains the values as 148, 145, 160, 157, 156, 160, 160, 160, 165, shows that the mode > median > mean.

    (b) Find the factors of $x^3 + 21x + 20$ by means of the remainder theorem.
21. Construct a triangle PQR in which mPQ $\overline{=}$ 6cm, m QR $\overline{=}$ 5cm and m < Q= 70°. Draw the in-circle of the triangle and write the steps of construction.

MATHEMATICS 2014

Time: 30 minutes Max Marks: 20

SECTION "A" (MULTIPLE CHOICE QUESTIONS)

1. **Choose the correct answer for each from the given options.**

1. { 0, 1, 2, 3, ------} is the set of:
- **a)** Prime no.
- **b)** Integer.
- **c)** Whole no.
- **d)** Even no.

2. The natural logarithm has the base:

- **a)** μ
- **b)** e
- **c)** 10
- **d)** None of these

3. $8^{1/3} x\ 36^{1/2} =$:

- **a)** 48
- **b)** 12
- **c)** 16
- **d)** None of these

4. If loga 16 + 4, a =:

- **a)** 3
- **b)** 4
- **c)** 2
- **d)** 16

5. The degree of given polynomial $x^4y + y + y^2 + y^3\ is$:

- **a)** 3
- **b)** 4
- **c)** 5
- **d)** 2

6. If the determinant of matrix is Zero, the matrix is called a/an:

- **a)** Identity matrix
- **b)** Null matrix
- **c)** Singular matrix
- **d)** Non singular matrix

7. The sub duplicate ration of a : b is:

- **a)** $a^2 : b^2$
- **b)** $a^{1/2} : b^{1/2}$
- **c)** $a^3 : b^3$
- **d)** $none\ of\ these$

8. The H.C.F of 8x3y2 and 12x2y is:

- **a)** $4x^3\ y$
- **b)** $8x^2\ y$
- **c)** $16x^2\ y$
- **d)** $4x^2\ y$

9. Line segment joining the vertex and to the mid of point of the opposite side of a triangle is called:

- **a)** Altitude
- **b)** Hypotenuse

c) median
d) none of these

10. A quadrilateral having opposite sides parallel is called:
a) Trapezium
b) Parallelogram
c) Rhombus
d) triangle

11. if x is eliminated from the equations x + b = 0 and x + c = 0 the relation becomes:
a) b = c
b) b + c = 0
c) bc = 0
d) b/c + 1 = 0

12. half of the diameter is called:
a) perpendicular
b) radius
c) chord
d) secant

13. $\sqrt{1 - cos^2\theta}$ =
a) Sinθ
b) Tan θ
c) Sec θ
d) cosec θ

14. tan 60° =
a) 1/ √3
b) -√3
c) 1
d) None of these

15. Simplest form of $\frac{a^5b - ab^5}{a^3b + ab^3}$ is:
a) $a^2 + b^2$
b) $a^2 - b^2$
c) a + b
d) a – b

16. the transpose matrix of $\begin{vmatrix} 5 & 3 \\ 1 & 6 \end{vmatrix}$ is:
a) $\begin{vmatrix} 5 & 1 \\ 3 & 6 \end{vmatrix}$
b) $\begin{vmatrix} 6 & 3 \\ 1 & 5 \end{vmatrix}$
c) $\begin{vmatrix} 1 & 6 \\ 5 & 3 \end{vmatrix}$

d) $\begin{vmatrix} 3 & 5 \\ 1 & 6 \end{vmatrix}$

17. Cos 20° = :

a) Cosec 70°
b) Tan 70°
c) Sin 70°
d) Cot 70°

18. A circle which touches all the three sides of a triangle is called:

a) Inscribed circle
b) Ascribed circle
c) Circum circle
d) None of these

19. The set A = { 1, 3, 5, 7, ---} is closed with respect to:

a) Multiplication
b) Addition
c) Subtraction
d) Division

20. The solution set of $\sqrt{2y-3}$ = $\sqrt{3y+4}$ is:

a) 1
b) 7
c) -7
d) 5

MATHEMATICS 2014

Time: 2 ½ Hours

SECTION "B" (SHORT-ANSWER QUESTIONS)

Note: Answer any 10 question from this section.

2. If U={1,2,3,4,5,6,7} , A= {1,3,5,7} and B={3,4,5,6}; Prove that A' U B'=(A∩B)'.

3. Simplify: $[\frac{(125)^2 x\ 8}{(64)^2}]^{1/2}$

4. If a+b =7 and ab = 11, find the value of (a-b).

5. Find the value of $\frac{85.7\ x\ 2.47}{8.89}$ with the help of logrithmetic table.

6. Factors. r^2 (s - t) + s^2 (t-r) + t^2 (r-s)

7. Solve the following equations with the help of matrix: 5x – 2y = 1, 2x – y = 0.

8. If one pair of opposite sides of a quadrilateral are congruent and parallel, it is a parallelogram. Prove it.

9. Solve the equation $2b^2$ -7b+5=0 using quadratic formula.

10. If a transversal intersects two coplanar lines, such that the pair of alternate angles are congruent, prove that the lines are parallel.

11. If a: b= c : d, prove that $\frac{a^2+b^2}{a^2-b^2}=\frac{ac+bd}{ac-bd}$

12. Prove that $\frac{1-sin\theta}{cos\theta}=\frac{cos}{1+sin\theta}$

13. For what value of a and b, $x^4+4x^3+10x^2+ax + b$ is a perfect square?

14. Eliminate x from the following equations:

$X+\frac{1}{x} = 2p$, $x-\frac{1}{x}=2q+1$

15. Prove that the sum of the three angles of a triangle is equal to 180^0

16. Find the values of the trigonometric ratios of an angle of30^0.

SECTION "C" DETAILED-ANSWER QYESTION)

NOTE: Attempt 3 questions from this section including QNO. 19,which is compulsory. (30)

17. Factorize the following:

a) a^3-a^2+2

b) $8a^3+b^3+27c^3-18abc$

c) $5x^2-13x-6$

d) x^3-64y^3

18. Find the solution set of the following equations graphically: (Find four ordered pairs for each equations)

X - 2y=-3

2x+y=14

19. In any correspondence of two triangles, if one side and any two angles of one triangles are congruent to the corresponding side and two angles of the other, the two triangles are congruent. Prove it,

20.

a. Find the variance from the following with the help of information:

$\dot{x}=19.5$, n=10, $\sum x^2 =555$

b. Factorize the following with the help of remainder theorem:

$x^3+8x^2+19x+12$

21. Draw a circle of radius 2.5 cm. Take a point B at a distance of 6.5cm from the centre of the circle and draw two tangents to the circle passing through B. Find the lengths of the segments of the tangents by measuring them. Verify your measurement with the help of Pythagoras Theorem.

MATHEMATICS 2013

TIME: 30 minutes

SECTION "A" MULTIPLE CHOICE QUESTION

1. CHOOSE THE CORRECT ANSWER FOR EACH FROM THE GIVEN OPTIONS:

1. In the relation R ={(2, -3), (2,6), (2,3)} the range R is:
- **a)** {3,6}
- **b)** {2}
- **c)** {2,3}
- **d)** None of them

2. If A=$\begin{bmatrix}5 & 6\\3 & -1\end{bmatrix}$, then A^t=
- **a)** $\begin{bmatrix}3 & -1\\5 & 6\end{bmatrix}$
- **b)** $\sqrt{\begin{bmatrix}5 & 3\\6 & -1\end{bmatrix}}$
- **c)** $\begin{bmatrix}-1 & 3\\6 & 5\end{bmatrix}$
- **d)** $\begin{bmatrix}5 & 6\\3 & -1\end{bmatrix}$

3. The degree of given polynomial $\sqrt[3]{(a^2-b)^3}$ is:
- **a)** 1
- **b)** 3
- **c)** 2
- **d)** 5

4. The logarithmic form of 2^5 =32 is:
- **a)** $log_{32}5$=2
- **b)** $log_2 32$=5
- **c)** $log_5 32$=2
- **d)** None of these.

5. The characteristics of $6.67X10^{-11}$ is:
- **a)** 3
- **b)** -3
- **c)** 5
- **d)** None of them.

6. Diameter is twice of the:
- **a)** Radius
- **b)** Perpendicular
- **c)** Chord
- **d)** Tangent

7. If 5:8 :: 5: x, then value of x is:
- **a)** 40
- **b)** 25
- **c)** 5
- **d)** 8

8. The solution set of $|y-3|=4$ is :

- **a)** {-1,2}
- **b)** {-2,-2}
- **c)** {7,-1}
- **d)** {1,3}

9. If x={2,3,5,7,11},then all the numbers in x are:

- **a)** Prime numbers
- **b)** Natural numbers
- **c)** Odd numbers
- **d)** Even numbers

10. $\sqrt{1-Sin^2\theta}$=……

- **a)** Cos θ
- **b)** tanθ
- **c)** Secθ
- **d)** Sinθ

11. A circle which touches all the sides of a triangle is called:

- **a)** Inscribed circle
- **b)** Escribed circle
- **c)** Circum circle
- **d)** none of them

12. Cotx=

- **a)** $\sqrt{\frac{cosx}{sinx}}$
- **b)** $\frac{sinx}{cosx}$
- **c)** $\frac{1}{cosx}$
- **d)** $\frac{1}{secx}$

13. If a:b :: b:c then b is called:

- **a)** 1st proportion
- **b)** Mean proportion
- **c)** 4th proportion
- **d)** None of them

14. The value appears most often in a set of data is called:

- **a)** Arithmetic mean
- **b)** Median
- **c)** Mode
- **d)** Average

15. The multiplicative inverse 0f $-1/2$ is:

- **a)** 2
- **b)** -2
- **c)** 6
- **d)** None of them

16. $Tan^2\theta$ +1=…..

- **a)** $sin^2\theta$
- **b)** $sec^2\theta$
- **c)** $cot^2\theta$
- **d)** $-tan^2\theta$

17. In a series 0,1,4,6,7,9,12 the median is:

- **e)** 7
- **a)** 6.5
- **b)** 6
- **c)** 9

18. cos 80^0=…..

- **a)** $Sin10^0$
- **b)** $cosec10^0$
- **c)** $cot10^0$
- **d)** None of them

19. $(\frac{1}{2})^3$= is…..

- **a)** 8
- **b)** 1/8
- **c)** 6
- **d)** 1/6

20. 3° =……

- **e)** 3
- **f)** 0
- **g)** 1
- **h)** 2

MATHEMATICS 2013

Time: 2 ½ Hours

SECTION "B" (SHORT-ANSWER QUESTIONS)

NOTE: Answer any 10 questions from this section. (50)

2. If A= {1,2,3,4} B={2,4,5,6} and C= {2,3,6,8} then find (A-B) x (B-C).
3. Simplify: $\sqrt[4]{\frac{a^x}{a^y}}$ x $\sqrt[4]{\frac{a^y}{a^r}}$ x $\sqrt[4]{\frac{a^r}{a^x}}$

4. If x=2 + $\sqrt{3}$, then find the value of: $x^2+\frac{1}{x^2}$
5. Find the value of $\frac{(86.2)^2(37.37)}{591}$ with the help of logrithmetic table.
6. Resolve into factors. a^2 (b-c) + b^2 (c-a) +c^2 (c-b)
7. If a transversal intersects two coplanar lines such that the pair of alternate angles are congruent. Prove that the lines are parallel.
8. What should be added to $4a^4$+$4a^3$ + $5a^2$+2a+5 so that it become a perfect square?
9. Solve, if possible by using Cramer's rule:

   2x+3y=-3

   4x+3y=5

10. Solve the equation $2x^2$-7x+6=0 by using quadratic equation.
11. Find all the trigonometric ratios of 45^0.
12. Eliminate 'y' from the equations:

    Y=1/4=a, $y^2+\frac{1}{y^2}=4a^2$.

13. If two angles of a triangle are congruent, prove that the sides opposite to them are also congruent.
14. If $\frac{a}{b}=\frac{c}{d}=\frac{e}{f}$then prove that $\frac{a^4b^2+a^2e^2-e^4f}{b^6+b^2f^2-f^5}=\frac{a^4}{b^4}$ Prove that a=b=c.
15. If a perpendicular is drawn from the centre to a chord of a circle. Prove that it bisects the chord.
16. A pole 14 meters high on the bank of a stream makes an angle of 30^0 with a place on the opposite bank. Find the breath of the stream.

SECTION 'C' (DETAILED-ANSWER QUESTION)

NOTE: Attempt 3 questions from this section, including Q.NO 19 which is compulsory.

17. Factorize the following:
    a) x^4 + $4y^4$
    b) $18y^2$+9y-20
    c) x^3+-x-2y+$8y^3$
    d) a^3-$8b^3$+$27c^3$+18abc

18. Find the solution set of the following equations graphically. (Find four ordered pairs of each equation).

    2x-y=5

    x-2y=1

19. In a correspondence of two right angled triangles. If their hypotenuses are congruent and more side of one triangle is congruent to the corresponding sides of the other, the two triangles are congruent. Prove it.

20.
    a) Find the variance of the following set of observation

X=11, 13, 25, 15, 12, 18, 17, 23, 20, 16

b) Find the factor of $x^3 - 4x^2 + 5x - 2$ by means of the remainder theorem.

21. Construct a triangle ABC in which m$\overline{AB}$ = 4cm, m$\overline{BC}$ = 5cm, and m<B = 60°. Draw the circum circle of the triangle and write the steps of construction.

MATHEMATICS 2012

TIME: 30 minutes

SECTION "A" MULTIPLE CHOICE QUESTION

1. CHOOSE THE CORRECT ANSWER FOR EACH FROM THE GIVEN OPTIONS:

1. (A')`
- a) A
- b) A'
- c) Ø
- d) U

2. 4 x 5° =
- a) 4
- b) 5
- c) 0
- d) 20

3. $\frac{logax^3y}{z^2} =$
- a) $logax^3y + loga^y - loga^{z^2}$
- b) $3loga^x + loga^y - 2loga^z$
- c) $3loga^x - loga^y + 2loga^z$
- d) $\frac{3loga^z - 2loga^z}{loga^y}$

4. If a + b=2 and a-b=2, find the value of $a^2 + b^2$.
- a) -1
- b) 2
- c) 4
- d) 3/2

5. The H.C.F of $x^4 - y^4 and\ x^2 + y^2\ is$:
- a) $x^4 - y^4$
- b) $x^2 + y^2$
- c) $(x^2 + y^2)(x^2 - Y^2)$
- d) $x^2 - y^2$

6. The scalar matrix is:

a) $\begin{bmatrix} 3 & 0 \\ 0 & 3 \end{bmatrix}$

b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

c) $\begin{bmatrix} 0 & 3 \\ 3 & 3 \end{bmatrix}$

d) $\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}$

7. $\frac{\tan Ø}{\sin Ø} =$

a) $cosØ$

b) $secØ$

c) $cotØ$

d) $cosecØ$

8. in a right angled triangle side opposite to < 90° is called:

a) hypotenuse

b) base

c) perpendicular

d) none of these

9. the range of 42, 55, 50, 53, 60, 35, 40 is:

a) 50

b) 27

c) 40

d) None of them

10. The point through which medians of triangle pass is called:

a) Orthocenter

b) Centroid

c) Circumcentre

d) In centre

11. Solution set of $\sqrt{2x+3} = 2$ is:

a) ½

b) -1/2

c) { }

d) -1

12. If a $\frac{a}{b} = \frac{c}{d}, the\ \frac{a+b}{b} = \frac{c+d}{d}$ is the property of:

a) Componendo

b) Alternendo

c) Dividendo

d) invertendo

13. sin 30° = _____

a) sin 60°
b) cos 60°
c) tan 30°
d) cot 30°

14. an angled inscribed in a semi circle is of:

a) 180°
b) 360°
c) 0°
d) 90°

15. $(\sqrt{2}+1)(\sqrt{2}-1$

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

16. If R = {(1,2), (2,3), (3.4)}, domain R =

a) {1}
b) (1,2)
c) {1,2,3}
d) {2,3}

17. If log10 1000=y, the value of **y** will be?

a) 10
b) 3
c) 5
d) 0

18. AΔB = ____

a) A∩B
b) AÜB
c) (A∩B)-(AÜB)
d) (AÜB)-(A∩B)

19. The multiplicative inverse of a – b is:

a) a + b
b) –a + b
c) 1/a-b
d) 1/a+b

MATHEMATICS 2012

Time: 2 ½ Hours

SECTION "B" (SHORT-ANSWER QUESTIONS)

NOTE: Answer any 10 questions from this section. (50)

2. If U={x|xε N, ʌx≤10} , A={2,4,6,8,10} , B={3,6,9,10}. Prove that (A∩B)' = A'UB'.
3. Simplify: $\left(\frac{x^l}{x^m}\right)^{l+m}$ x $\left(\frac{x^m}{x^{nm}}\right)^{n+m}$ x $\left(\frac{x^n}{x^l}\right)^{n+l}$
4. If P = 3 + 2 $\sqrt{2}$, find the value of $p^2 + \frac{1}{p^2}$
5. With the help of log tables, find the value of $\frac{0.87}{(28.9)(0.785)}$
6. Resolve into factors: r(s – 1) + $s^2(1-r) + t^2\,(r-s)$
7. The sum of three consecutive odd numbers is 909. Find the numbers.
8. For what values of 'a' and 'b' will the expression $x^2 + 4x^3 + 10x^2 + ax + b$ be a perfect square?
9. By using Cramer's rule, solve the equation:

   2x + 5y = 9

   4x – 2y =1

10. Find the solution set with the help of quadratic equation.

    $2b^2$ - 7b + 5 = 0

11. Prove that the sum of the three angles of a triangle is equal to 180°.
12. Find the relation independent of't' from the following equation.

    X = $\frac{a(1-t^2)}{1+t^2}$ y = $\frac{b(1-t^2)}{2t^2}$

13. If a transversal intersect two parallel lines, the alternate angles so formed are congruent. Prove it.
14. If $\frac{a}{b+c} = \frac{b}{c+a} = \frac{c}{a+b}$ and a + b + c ≠ 0

    Prove that a = b = c.

15. If two sides of a triangle are congruent, the angles opposite to them are also congruent. Prove it.
16. Prove that cotβ + tanβ = cotβ $sec^2\beta$

SECTION 'C' (DETAILED – ANSWER QUESTION)

NOTE: Attempt 3 questions from this section, including Q.no.19 which is compulsory. (30)

17. Factorize the following:

a) $x^6 - 64$

b) $a^8 + a^4 + 1$

c) $(ab + cd)^2 - (ac - bd)^2$

d) $x^2 + 15x - 100$

18. Find the Solution set of the following equations graphically. (Find four ordered pairs of each equation).

$4x - y - 10 = 0$

$3x + 5y - 19 = 0$

19. In a correspondence of triangles if three sides of one triangle are congruent to the corresponding three sides of the other, the two triangles are congruent. Prove it.

20.

a) Marks obtained by some students in computer science exam are given below. Find Median of their numbers.

Marks	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49
No. of students	25	28	32	25	13	12

b) Find the factors of $x^3 - x^2 - 14x + 24$ with the help of remainder theorem.

21. Draw the transverse common tangents of the two circles with the radii 3cm and 2cm, when the distance b/w their centers is 6cm. Write down the steps of construction.

MATHEMATICS 2011

Time: 30 minutes Max. Marks: 20

SECTION "A" (COMPULSORY) (M.C.Q.)

1. Choose the correct answer for each from the given options: (20)

1. In a right angled triangle, the side opposite to the right angle is …….

(a) Perpendicular
(b) Hypotenuse
(c) Diagonal
(d) Base

2. If S.D of a series is 4, its variance is …….

(a) 2 **(b)** 20 **(c)** 36 **(d)** 16

3. $1 + \tan 45° = sec^2$ ……..

(a) 30° **(b)** 90° **(c)** 60° **(d)** 45°

4. The mean proportion of and 56 is ……

(a) 12 **(b)** 24 **(c)** 28 **(d)** 36

5. If x + 5: x +7 = 5: 7 then x = ……..

(a) 0 **(b)** 1 **(c)** -1 **(d)** 2

6. If $\sqrt{x-2}$ = -4 then the solution set of x = ……..

(a) ±4 **(b)** 18 **(c)** {Ø} **(d)** None of them

7. {0, 1, 2, 3 …..} Is the set of ……

(a) Prime number **(b)** Even number
(c) Whole number **(d)** Odd number

8. If $log_4 x = \frac{-3}{2}$, x = …….

(a) $1/8$ **(b)** 8 **(c)** $\frac{1}{6}$ **(d)** $\frac{1}{9}$

9. $[-1\ (-1)^5]2$= …….

(a) -1 **(b)** 1 **(c)** 0 **(d)** 2

10. $x^4 + 64$ can be made a perfect square by adding …….

(a) 4x2 **(b)** $8x^2$ **(c)** $2x^2$ **(d)** $16x^2$

11. Sin 60° = ……

(a) $1/2$ **(b)** $\sqrt{3}/2$ **(c)** $1/\sqrt{3}$ **(d)** $1/\sqrt{2}$

12. If A = $\begin{bmatrix} 1 & 2 \\ 3 & P \end{bmatrix}$ is a singular matrix, find the value of P =

(a) 5 **(b)** 6 **(c)** 1 **(d)** -1

13. The median of [0, 2, 4, 6, 8, 9] is ……

(b) 4 **(b)** 6 **(c)** 8 **(d)** 5

14. The angle inscribed in a major arc is a/an …… angle.

(a) Acute angle **(c)** Right angle
(b) Obtuse angle **(d)** Adjacent angle

15. $\frac{a}{\sqrt{a}}$ = ……..

(c) a **(b)** $\frac{1}{\sqrt{a}}$ **(c)** $\sqrt{a}$ **(d)** a^2

16. The degree of polynomial $x^2 + xy^2 + y$ is_____

(a) 2 **(b)** 3 **(c)** 4 **(d)** 1

17. The characteristic of 0.00234 is ……

(a) 2 **(b)** $\bar{2}$ **(c)** 3 **(d)** $\bar{3}$

18. (x-6)(x-4) = ...

(a) x^2+10x-24 **(c)** x^2-10x-24
(b) (c) x^2+10x+24 **(d)** x^2-10x+24

19. The line touching at a point of a circle is called …….

(a) Diameter **(b)** Chord **(c)** Radius **(d)** Tangent

20. If the sum of 10 observations is 25, its mean is ……..

(a) 5 **(b)** 50 **(c)** 12.5 **(d)** 75

MATHEMATICS **2011**

Time: $2^1/_2$ Hours **Max. Marks: 80**

SECTION "B" (SHORT-ANSWER QUESTIONS)

Note: Answer 10 questions from this section. (50)

2. If A= (1, 2, 3, 4) and B= (2, 4, 6, 8), show that (A U B)-(A Π B) = A Δ B.
3. With the help of log table, find the value of $\frac{(6.735)(48.27)}{(16.18)^2}$
4. Find the value of $a^3 - \frac{1}{a^3}$ when a- $\frac{1}{a}$=4
5. Resolve into factors: x^2(y – z) + $y^2(z - x) + z^2\,(x - y)$
6. Find the solution set of $x^2 + 8x + 15 = 0$ with the help of quadratic equation.
7. Simplify the following: $\binom{x^{2a}}{x^{a+b}}\binom{x^{2b}}{x^{b+c}}\binom{x^{2c}}{x^{c+a}}$
8. Find the value of 'q', $4x^4 + 12x^3 + 25x^2 + 24x + q$ will be a perfect square.
9. If A = $\begin{bmatrix}3 & 2\\ 1 & 0\end{bmatrix}$; prove that $AA^{-1} = 1$
10. Find the relation independent of 'x' from the following equation: x+$\frac{1}{x} = 2a, x^3 + \frac{1}{3} = b^3$
11. If two angles of a triangle are congruent, the sides opposite to them are also congruent. Prove.
12. Find the solution set of the equation $\left|\frac{2x+5}{5}\right| - 3 = 1$
13. If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, Prove that $(a^2 + c^2 + e^2)\,(b^2 + d^2 + f^2)$= (ab + cd + ef)^2
14. 14. If a perpendicular is drawn from the center to a chord of a circle, it bisects the chord. Prove.
15. $sin^2\theta + cos^2\theta = 1$.
16. . Find the solution set of: $\sqrt{25y - 6} = 4\sqrt{y + 3}$

SECTION 'C' (DETAILED – ANSWER QUESTIONS)

NOTE: Attempt 3 questions from this section, including Q.no.19 which is compulsory (30)

17. Factorize the following:- (10)
    a) $18x^2$ + 9x – 20
    b) $a^4 + 64$
    c) $a^3 - a^2 + 2$
    d) $27x^3 - 1 + 8y^6 + 18xy^2$
18. Find the solution set of following equations graphically: (Find four ordered pairs for each equation.)

    X-2y = -3

    2x+y = 14

19. In any correspondence of two right-angles, if their hypotenuses are congruent and one more side of one triangle is congruent to the corresponding side of the other, the two triangles are congruent. Prove it.
(10)

20.

(a) The marks obtained by 84 students in an examination are given below. Find the mean:

Marks	25-29	30-34	35-39	40-44	45-49
Students	9	18	35	17	5

(b) Factors with the help of remainder theorem. (05)

$x^3 + 3x^3 + 4x - 28.$

21. Take two points' p & q at a distance of 7cm. Draw circles with the radii of 2.8cm, and 1.6cm with centers p & q. Draw direct common tangent to these circles & write steps pf construction.

MATHEMATICS 2010

TIME: 30minutes Max. Marks: 20

SECTION 'A' MULTIPLE CHOICE QUESTION

1. Choose the correct answer for each from the given options: (20)

1. $(\sqrt{x} + \sqrt{y})(\sqrt{x}-\sqrt{y}) =$ ……

(a) $(\sqrt{x} + \sqrt{y})^2$ **(b)** $(\sqrt{x}-\sqrt{y})^2$

(c) $(\sqrt{x}-\sqrt{y})$ **(d)** (x-y)

2. In a right angle triangle, the side opposite the right angle is_____

(a) Diagonal **(b)** Hypotenuse

(c) Median **(d)** Altitude

3. The mean proportional to 75 and 12 _____

(a) ±20 **(c)** ±10

(b) ±30 **(d)** ±40

4. The ordered pair (0,2) lies in/on =_____

(a) 1st quadrant **(c)** 4th quadrant

(b) x-axis **(d)** y-axis

5. The Cartesian product of set A and B is written as _____

(a) A.B **(c)** AxB

(b) AΔB **(d)** BxA

6. One and only one plane passes through_____ non collinear points.

(a) One **(c)** Three

(b) Two **(d)** None of them

7. $(64)^{-1/6}$ =_____

(a) 1 **(c)** 2

(b) $\frac{1}{2}$ **(d)** $\frac{1}{4}$

8. In similar triangles _____ are congruent.

(a) Sides **(c)** Angles

(b) Angles and sides **(d)** Hypotenuse

9. If $\log_a 16=4$, ´a´ =_____

(a) 4 **(c)** 2

(b) $\frac{1}{4}$ **(d)** 3

10. sin Θ. Sec Θ =_____

(a) 1 **(c)** 0

(b) cot Θ **(d)** tan Θ

11. If x = 1 and y = 1, then value of x-y +xy = _____

1. 1 **(c)** 0

2. 2 **(d)** -1

12. If a : b = c : d, then value a : c = b : d. this property is called _____

(a) Invertendo **(c)** Dividendo

(b) Alternando **(d)** Componendo

13. The L.C.M of x^3-y^3 and x^6-y^6 =_____

(a) x^3-y^3 **(c)** x^3+y^3

(b) x^6+y^6 **(d)** x^6-y^6

14. The point of concurrency of the medians of aa triangle is called _____ of the triangle.

(a) centroid **(c)** in-center

(b) circum-center **(d)** ortho-center

15. Eliminate ´b´ from a +3b = 1 and a + b = 3, the new relation is =_____

(a) a = 5 **(c)** a = -2

(b) a = 7 **(d)** a = 4

16. The additive inverse of $\begin{bmatrix} 7 & -8 \\ 6 & 3 \end{bmatrix}$ = _____

(a) $\begin{bmatrix} -8 & 7 \\ 3 & 6 \end{bmatrix}$ **(c)** $\begin{bmatrix} 3 & 8 \\ -6 & 7 \end{bmatrix}$

(b) $\begin{bmatrix} -7 & 8 \\ -6 & -3 \end{bmatrix}$ **(d)** $\begin{bmatrix} -7 & 6 \\ -8 & -3 \end{bmatrix}$

17. If the standard deviation of a series is 4 , then its variances =_____

(a) 20 **(c)** 36

(b) 16 **(d)** 2

18. If $\sqrt{2y-3} = \sqrt{3y+4}$, y =_____

(a) 5 **(c)** 7

(b) -7 **(d)** $^{7}/_{5}$

19. The chord which passes through the circle is called _____

(a) Diameter **(c)** Radius

(b) Secant **(d)** Tangent

20. f two angles are complementary, each of them is a/an _____ angle

(a) right **(c)** obtuse

(b) acute **(d)** none of them

MATHEMATICS 2010

Time: $2^{1}/_{2}$ Hours **Max. Marks: 80**

SECTION "B" (SHORT-ANSWER QUESTIONS)

NOTE: Answer any 10 questions from this section. (50)

1. If A = {1,2,3,5,6} and B= {2, 4, 6, 7}, find A Δ B.

2. Simplify: $\left(\frac{x^l}{x^m}\right)^{l+m}$ x $\left(\frac{x^m}{x^{nm}}\right)^{n+m}$ x $\left(\frac{x^n}{x^l}\right)^{n+l}$

3. With the help of log tables, find the values of $\frac{85.7\times2.47}{8.99}$

4. If a + b = 5 and a – b =3, find the value of $a^2 + b^2$.

5. Resolve the following into factors

$$x^2(y-z) + y^2(z-x) + z^2(x-y)$$

6. Apply Cramer's rule to solve the given equations:

4x+y = 2

7x+2y = 3

7. Prove that the sum of the measures of the three angles of a triangle is 180º.

8. Find the solution set of $2x^2 - 7x + 6 = 0$ *by using the* quadratic equation formula.

9. Find the solution set of the equation $\sqrt{4x-5} = \sqrt{3x+7}$

10. Eliminate 'x; from the following equations and find the new relationship:

X + $\frac{1}{x}$= 2p. x - $\frac{1}{x} = 2q + 1$

11. !f $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$, Prove that $\frac{a^4b^2 + a^2e^2 - e^4f}{b^6 + b^2f^2 - f^5} = \frac{a^4}{b^4}$

12. If two sides of a triangle are unequal in length, the longer side has the angle of greater measure opposite it. Prove.

13. If two tangents are drawn to a circle from a point outside it, prove that these tangents are equal in length.

14. Find the values of the trigonometric ratios of 30º.

15. For what values of 'a' and 'b' will the expression $x^2 + 4x^3 + 10x^2 + ax + b$ be a perfect square?

SECTION 'C' (DETAILED – ANSWER QUESTIONS)

NOTE: Attempt 3 questions from this section, including Q.no.19 which is compulsory (30)

16. Factorize the following:-

1. $x^2 + 15x - 100$
2. $x^6 + 64y^6$
3. $x^4 + 4y^4$
4. $27x^3 - 1 + 8y^6 + 18xy^2$

17. Find the solution set of the following equations graphically: (find four ordered pairs for each equation)

5x +7y = 13
7x + 6y = 3

18. In any corresponding of two triangles. If one side and any two angles of one triangle are congruent to the corresponding side and angles of the other, prove that two triangles are congruent.

19.

A. The marks obtained by some students in a chemistry exam. Are given below. Find the mean of their marks.

Marks	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
Students	**9**	**18**	**35**	**17**	**5**

B. Find the factor of $x^3 - 11x^2 + 36x - 36$ by means of the reminder theorem.

20. Draw a circle of radium 2.5cm. Take a point P at a distance of the circle and draw two tangents to the circle passing through p. find the lengths of the segments of the tangents by measuring them. Verify your results with the help of Pythagoras theorem. (the steps of constructions are not required).

MATHEMATICS 2009

Time: 3 hours Max Marks: 100

OBJECTIVE (COMPULSORY)

1. (a) Fill in the following blanks with the correct answers:

a) $5^{3^2} \div 5^{2^3}$=**5.**

b) The sum of all the angles of a cycle quadrilateral is **360.**

c) $\sqrt{1\text{-}cos^2\theta}$ = **Sin θ.**

d) 3median – 2mean = **Mode.**

e) The G.C.D. of 18 x^5y^2 and $12x^3y^4$ is **$6x^3y^4$**

1. **(b)** Select the correct answer for each from the options given within brackets:

a) π is a/an _____ number. (prime, **rational**, irrational)

b) The solution set of |4x| = **-2** (1, **-2**, Φ)

c) Cosec 30º = _____. (**2**, 2/√3, 1/√2)

d) If A=$\begin{bmatrix} 1 & 2 \\ 3 & p \end{bmatrix}$, then p = _____. (5,**6**,-1)

e) If log_x 32 = 5, x= _____. (**2**,5,16)

SECTION 'A'

2. **(a)** If U={x|xε N, ʌx≤10} , A={1,3,5,7} , B={1,5,6,8}. Prove that (A∩B)' = A'UB'.

(b) If A={2,3,4} and B={a,b} , find A x B.

3. **(a)**. Simplify $(x^a/x^b)^{a+b}$ x $(x^b/x^c)^{b+c} \div 4\ (x^c.x^a)^{a-c}$

(b) If a+b=9 and ab=20, find the value of $a^2 + b^2$.

4. **(A)** Factorize any four of the following:

a) $10x^2$-17x+6

b) a^6-b^6

c) ab+amx-bx-mx^2

d) x^4-1111x^2+1

e) x^2y^2-16xy+64

f) x^3 -x^2+2

5. **(A)** If A=$\begin{bmatrix} -3 & -2 \\ 5 & 6 \end{bmatrix}$, find A^{-1} and also prove that AA^{-1}=!.

(B) What should be added to x4+4x^3+10x^2+14x+5 to make it to a perfect square?

6. Find the solution set of the equations graphically. (Find four ordered pairs for each equation.)

4x-y=5, x+5y=17

7. **(a)** Find the value of $(86.2)^2$x(37.37)/591 with the help of log table.

(b) Find the relation free of 'x' from the following equations:

x/a + a/x =2b

x/a = a/x =2c

8. **(a)** Factorize x3=5x2-2x-24 with the help of the Remainder Theorem.

(b) Simplify (1-$\frac{a+b}{a-b}$) ÷ $\frac{4a}{2a^2-2ab}$

9. Find the solution set of any Two of the following:

(i) $\frac{|8x+5|}{2}$ -1=3 **(ii)** √25x-6 =4√x+3 **(iii)** x^2+10x-24=0

10. Draw two circles of radii 3cm and 1.5cm such that the distance between their centre in 6.2cm. Draw their direct common tangents and write the steps of construction.

11. (a) Prove that the central angle of a minor arc of a circle is double (in measure) of the inscribed angle of the corresponding major arc.

(B). If a diameter of a circle is perpendicular to a chord. Prove that it bisects the chord.

12. If in a given correspondence of two triangles, the three sides of one are respectively congruent to the corresponding three sides of the other; prove that the triangles are congruent.

13. (a) If two coplanar lines are cut by a transversal such that the alternate angles so formed are congruent, prove that the lines are parallel.

(b) If two sides of a triangle are unequal in measure, prove that the angle opposite the longer sides is greater than the angle opposite to the shorter side.

14. (a) The line segment that joins the mid-points of the two sides of a triangle is parallel to the third side and is equal to one half of it in length. Prove.

(b) If two angles of a triangle are congruent, the sides opposite to then are also congruent. Prove.

SECTION 'C'

15. (a) Find the variance from the following information:

$\bar{x}$=12.5, $\sum$x=125, $\sum x^2$= 6666

(b) Prove that $\frac{Sin\theta}{1-cos\theta} = \frac{1+cos\theta}{sin\theta}$

16. (a) Find all the trigonometric ratios of the angle of 45º

(b) The marks obtained by some students in a subject are given below:

Find their arithmetic mean.

Marks	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**
Students	**9**	**18**	**35**	**17**	**5**

MATHEMATICS 2008

Time: 3 hours **Max. Marks: 100**

OBJECTIVE (COMPULSORY)

1 (A) Fill in the following blanks with the correct answers:

a) {0,1,2,3,……} is the set of **whole number.**

b) (ii) x^4+64 can be made a perfect square by adding **$16x^2$.**

c) (iii) The reciprocal of sin θ = **cosec θ.**

d) (iv) Of -2, -1, 0, 1, 2, the mean is **0.**

e) (v) A line cannot be **parallel** to two intersecting lines.

(B) Select the correct answer for each from the options given within brackets:

a) If 'A' is the real number, the point (o,a) lies _____.

(in the second quadrant, on X-axis, **on Y-axis**)

b) If x=2+√3, then x^2=_____.

(7, **7+4√3**, 2√3)

c) Each of the supplementary angles can be a/an _____.

(**right angle**, acute angle, obtuse angle)

d) In a series 0, 1, 4, 6, 7, 9, 12, the median is _____.

(5,**6**, 7)

e) If in a right angled –triangle ABC, m∠B=90^0 and the measures of its sides a, b, c are 6, 10, and 8 respectively, then tan m∠A=_____.($\frac{3}{5}, \frac{4}{5}, \frac{3}{4}$)

SECTION 'A'

2.

a) If U={x|xεNΛx≤20}, A={2, 4, 6, ….., 20} and B={1, 3, 5, ……., 19} verify that (A∩B)'=A'UB'.

b) Find P(B) when B={x, y, z}.

3.

a) Simplify $(x^{2a}/x^{a+b})(x^{2b}/x^{b+c})(x^{2c}/x^{c+a})$

b) What should be subtracted from the expression x^4+2x^3 + 3x^2+x-2 so that it becomes a perfect square.

4. Factorize any four of the following:

a) x^2-yz+xy-xz

b) (ii)4x^2+5x-21

c) (iii) a^4+4

d) (iv) 1+2ab-($a^2 + b^2$)

e) (v) x^3-x-2y+8y^3

f) (vi) $a^3 - b^3 - 27c^3$-9abc

5.

a) If a+b+c=9 & $a^2 + b^2 + c^2$=29, find the value of ab+BC+ca.

b) Factorize $x^3 - x^2$-14x+24 with the help of the remainder theorem.

6. Find the solution set of the following equation graphically (Find four ordered pairs for each equation)

3x=7+2y, 5x+y=3

7.

a) With the help of log tables, find the value of $\frac{0.87}{(28.9)(0.785)}$

b) Eliminate 't' from the given equation and find the new relationship:

X=at^2, y=bt^3

8.

a) If A=$\begin{bmatrix} -3 & -2 \\ 5 & 6 \end{bmatrix}$, find A^{-1} and verify that $A.A^{-1}$=1.

b) Simplify: $\frac{4x-3y}{9x^2-4y^2} - \frac{1}{3x+2y}$.

9. Find the solution set of any two of the following:

(i) $|\frac{2x-1}{3}|-2=0$ **(ii)** $\frac{\sqrt{3x}+5}{2}=10$ **(iii)** $x^2+6x-40=0$

SECTION 'B'

10. Draw a triangle ABC such that m**AB**=4.3cm, m**AC**= 5.2cm and m**BC**= 6cm. Draw its circumscribed circle. Write also the steps of construction.

11.

a) If a diameter of a circle bisects a chord, prove, that it is perpendicular to the chord.

b) Prove that a line which is perpendicular to a radial segment of a circle at the end-point (which is on the circle) is tangent to the circle.

12. If in the correspondence of two right-angled triangles, the hypotenuse and one side of one arc congruent respectively to the hypotenuse and the corresponding side of the other, then prove that the triangles are congruent.

13.

a) If two angles of a triangle are congruent, then the sides opposite to them are also congruent. Prove.

b) In a triangle if the sum of the square of the measures of the two sides is equal to the square of the measure of the third side, then prove that triangle is a right-angled one.

14.

a) If three or more parallel lines intercept congruent segments on one transversal, then they intercept congruent segments on the other transversal as well. Prove.

b) Prove that the sum of the measures of the two sides of a triangle is greater than the measure of its third side.

SECTION 'C'

15.

a) Prove that $sin^2 60^0+cos^2 60^0=1$

b) Find the variance of the following set of numbers:

X=3, 5, 7, 9, 11, 13

16.

a) The foot of a tower is at a distance of 210 dm from a point on the earth. The angle of elevation of the tower from its point is 60^0; find the height of the tower.

b) The following are the percentages of marks obtained by 10 students in Mathematics: X=23, 15, 35, 48, 41, 5, 8, 9, 11, and 51. Find the median of the marks of the students.