Instructions for Test – (Mathematics)

1. There are 100 questions and you have 90 minutes to attempt them.
2. Write your name and roll number on the answer sheet and on the specified space given in question paper only.
3. There are two tests in total. Out of these, first test is for Mathematics and second one for your competency in English language.
4. Every question is followed by four alternative answers lettered as A, B, C and D.
5. Use of calculator is not allowed.
6. You should use a block marker to fill the correct box on the answer sheet against the question number.
7. Squares not completely filled will be considered as incorrect answers.
8. If you fill more than one alternative for one question, neither will be valid.
9. All questions carry equal marks.
10. After completion of the test, you must hand over the answer sheet and question paper both to the examiner. Papers of candidates failing to do so will be cancelled.
11. The result declared will be final, i.e., no objection will be accepted nor any answer sheet will be shown.
12. Do not write anything on the question paper. Rough work may be done on sheets provided separately for this purpose.
13. Start the test only when you are instructed to do so.
14. Stop immediately when announced.
15. Do not go to the next test until announced.
16. Violation of instruction may lead to expulsion from the test.

<u>Example:</u>

If the dispersion is small, the standard deviation is:

A)   large   B)   zero
C)   small   D)   negative

The correct answer for the above question is small; therefore fill the square under C in your answer sheet as shown below.

A	B	C	D
☐	☐	■	☐

DO NOT TURN THE PAGE

Total marks 100   **Time duration 90 mints**

Section I: Mathematics

Q:-1   The series 1-4+16-64+………
    A)   Convergent   B)   Divergent
    C)   Absolutely convergent   D)   None of these

Q:-2   If $\frac{1}{2}$, a, $\frac{3}{8}$ is a geometric sequence then a=
    A) $\frac{3}{4}$ B) $\frac{2}{5}$
    C) $\frac{\sqrt{3}}{4}$ D) $\frac{7}{16}$

Q:-3   If |y|=|x| then graph is
    A)   Parabola   B)   A square
    C)   Circle   D)   Two intersecting lines

Q:-4   In 10 minutes the number of degrees the hour hand of a clock rotates is
    A)   60   B)   10
    C)   25   D)   1

Q:-5   If x=3i, y=2i and z=1+i then $xy^2z =$
    A)   12-12i   B)   -1
    C)   1-i   D)   0

Q:-6   If α,β are the roots of the equation $px^2 + qx + r = 0,$ then what is the vaue of $(\alpha - \beta)^2$?
    A) $\frac{(q^2 - 4pr)}{p^2}$ B) $\frac{(q^2 - 2pr)}{p^2}$
    C) $\frac{(q^2 - 4pr)}{q^2}$ D)   None of these

Q:-7   Simplify the expression $\frac{sinx}{1 + cosx} + \frac{1 + cosx}{sinx}$
    A) $2cosecx$ B) $2secx$
    C) $cosx$ D) $2tanx$

Q:-8   The sum of the infinite geometric series $\frac{2}{3} + \frac{1}{3} + \frac{1}{6} + \cdots$ up to 8 terms is
    A) $\frac{85}{64}$ B) $\frac{95}{64}$
    C) $\frac{75}{64}$ D) $\frac{65}{64}$

Q:-9   The area under the curve $f(x) = x^2$ for -2 ≤ x ≤ 3 is
    A)   5   B) $\frac{35}{3}$
    C) $\frac{19}{3}$ D)   19

Q:-10 The coefficient of x^3 in the binomial expansion of $(2 - x)^4$ is

A)   56   B)   8

C)   -8   D)   4

Q:-11 If $f(x) = 2x - 3,$ $f^{-1}(x) is$

A) $\dfrac{x-2}{x}$ B) $\dfrac{x-3}{2}$

C) $\dfrac{x+3}{2}$ D) $\dfrac{3}{x-2}$

Q:-12 The value of $(-i)^{-19} = ?$

A) $1i$ B)   -1

C)   1   D)   i

Q:-13 The volume of the parallelepiped with u , v and w as its sides is

A) $u.(v \times w)$ B) $\dfrac{1}{2} u.(v \times w)$

C) $\dfrac{1}{6} u.(v \times w)$ D)   None of these

Q:-14 Two lines $a_1 x + b_1 y + c_1 = 0,$ $a_2 x + b_2 y + c_2 = 0,$ $intersect \ only \ if$

A) $a_1 a_2 - b_1 b_2 = 0$ B) $a_1 b_2 - a_2 b_1 \neq 0$

C) $a_1 a_2 - b_1 b_2 = 1$ D) $a_1 a_2 - b_1 b_2 \neq 1$

Q:-15 A dice is rolled, what is the probability of getting a number greater than 4?

A)   1/4   B)   1/2

C)   1/3   D)   1/6

Q:-16 If $y^3 + xy^2 - 2x = 0$ defines y implicitly as a function of x, then the value of $\dfrac{dy}{dx}$ at the point (4, -2) is

A)   -1/2   B)   -1/8

C)   1/4   D)   ½

Q:-17 The expression $\dfrac{2+i}{3+i}$ is equivalent to

A) $\dfrac{6+i}{8}$ B) $\dfrac{7-5i}{10}$

C) $\dfrac{7+i}{10}$ D) $\dfrac{7+i}{15}$

Q:-18 If a rubber ball that is dropped from a height of 9 meters always rebound one third of the distance of the previous fall, how high does it rebound the sixth time?

A)   243   B)   1/243

C)   81   D)   1/81

Q:-19 The coefficient of term a^2 in the expansion of $(1 + a)^{-2}$

A)   5   B)   6

C)   3   D)   -3

Q:-20 Logarithmic form of $b^0 = 1$ is

A) $\log_b 1 = 0$ B) $\log_b 0 = 1$

C) $log_1 b = 0$ D) $log_o b = 1$

Q:-21 If f(x) is a linear function such that f(-2)=11, f(5)=-3 then f(X) is
A)   -2x+7   B)   2x+7
C)   2x-7   D)   None of these

Q:-22 Let f: R→R be any function and g: R→R is defined as g(x)=| f(x) | for all x then g is
A)   g is on-to   B)   g is one-one
C)   g is continuous   D)   None of these

Q:-23 If y= $e^{\ln(sinx)}$ then $\dfrac{dy}{dx}$ =

A) $\dfrac{1}{sinx} e^{\ln(sinx)}$ B) $cosx$

C) $cosx \cdot e^{\ln(sinx)}$ D)   sinx

Q:-24 If $f(x) = x - e^x$ then the graph of f(x) has:
A)   a minimum value at x=0   B)   a maximum value at x=0
C)   a minimum value at x=0   D)   a maximum value at x=1

Q:-25 If $f(x) = x^2 + 2x - 3$ then f(x) is increasing in the interval:
A) $(-\infty, -1)$ B) $(-\infty, \infty)$
C) $(-1, +\infty)$ D)   None of these

Q:-26 Equation of tangent at (2,4) to the curve $y = x^5$ is :
A)   x-y-4=0   B)   4x-y-4=0
C)   x-4y+4=0   D)   None of these

Q:-27 The value of x at the point on the curve $y = x^2 - 8x + 3$ where the gradient is 2:
A)   -5   B)   -3
C)   1   D)   5

Q:-28 If $f(x) = \ln(2x), x \neq 0\ then\ f'(x) =$
A)   1/2x   B)   -1/x
C)   1/x   D)   None of these

Q:-29 Point of inflextion on the curve with equation $y = x^3 - 3x^2 + 3x + 2$ is :
A)   (1,3)   B)   (1,1)
C)   (0,1)   D)   None of these

Q:-30 $\int_0^{\pi} tanx dx$ can be evaluated if:

A)   n=$\dfrac{\pi}{4}$ B)   n=$\dfrac{\pi}{2}$

C)   n= $-\dfrac{\pi}{2}$ D)   Any real no.

Q:-31 The conjugate of $- 6 + 3i$
A) $- 6 + 3i$ B) $- 6 - 3i$
C) $6 + 3i$ D) $6 - 3i$

Q:-32 $2x^2 + 3y^2 =$
A) $(2x + 3iy)(2x - 3iy)$ B) $(\sqrt{2}x + \sqrt{3}iy)(\sqrt{2}x - \sqrt{3}iy)$
C) $(2x - 3y)(2x + 3y)$ D) $(\sqrt{2}x + \sqrt{3}y)(\sqrt{2}x - \sqrt{3}y)$

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Q:-33   The value of $i^n =$ _____ where n is an odd No.
A) $-i$ B) $+i$
C) $\pm i$ D)   1

Q:-34   Truth table containing all false values is called
A)   Tautology   B)   Contradiction
C)   Equivalent   D)   None of these

Q:-35   Every recurring non terminating decimal represents
A)   Q   B)   Z
C)   N   D)   None of these

Q:-36   If $\begin{vmatrix} 6 & \alpha \\ 3 & 2 \end{vmatrix}$ is singular matrix then $\alpha =$
A)   4   B) -4
C)   12   D)   18

Q:-37. For any two non singular square matrices A and B, $(AB)^{-1} =$
A) $B^{-1}A^{-1}$ B) AB
C) $A^{-1}B^{-1}$ D) $A^{-1}B$

Q:-38   The roots of quadratic equation $ax^2 - bx - c = 0$ are real and repeated if
A) $b^2 + 4ac \sim 0$ B) $b^2 - 4ac < 0$
C) $b^2 + 4ac > 0$ D) $b^2 - 4ac = 0$

Q:-39   If w, w^2 are complex cube roots of unity Then $w + w^2 =$
A)   1   B) -1
C)   0   D)   w

Q:-40   If 4 & - 5 are the roots, then quadratic equation will be
A) $x^2 - x - 20 = 0$ B) $x^2 - x + 20 = 0$
C) $x^2 + x - 20 = 0$ D) $x^2 + x + 20 = 0$

Q:-41 $\dfrac{x^2 - 3}{3x + 1}$ is a
A)   rational fraction   B)   proper fraction
C)   improper fraction   D)   None of these

Q:-42   The solution set of $sinx + cosx = \sqrt{2}$ is
A) $\left\{\dfrac{\pi}{4} + n\pi\right\}$ B) $\left\{\dfrac{\pi}{4} + 2n\pi\right\}$

C) $\left\{\dfrac{\pi}{3} + 2n\pi\right\} U \left\{\dfrac{5\pi}{3} + 2n\pi\right\}$ D) $\left\{\dfrac{\pi}{6} + 2n\pi\right\} U \left\{\dfrac{5\pi}{6} + 2n\pi\right\}$

Q:-43 $Sin^{-1}A + Sin^{-1}B =$
A) $Cos^{-1}\{AB + \sqrt{1-A^2} \sqrt{1-B^2}\}$ B) $Cos^{-1}\{2A^2 -1\}$
C) $Sin^{-1}\{A- \sqrt{1-B^2} + B- \sqrt{1-A^2}\}$ D) $Cos^{-1}\{AB - \sqrt{1-A^2} \sqrt{1-B^2}\}$

Q:-44 $^nC2$ exists when n is ……..
A) $n \geq 2$ B) $n \leq 2$
C) $n < 2$ D)   none of above

Q:-45   The number of distinct permutations from the letters of the word, "ARTICLE" using all the letters are

A) 7!   B) 7
C) 49   D) 59

Q:-46 In which quadrant does the terminal side lie if sin x> 0 and tan x >0
A) 1st   B) 2nd
C) 3rd   D) 4th

Q:-47 $Cos9\pi$ _____ ?
A) 1   B) -1
C) 0   D) 10

Q:-48 A function f(x) is said to be the periodic function if, for all x in the domain of f, there exists a smallest positive number p such that f(x + p) =
A) f(p)   B) f(x)
C) 0   D) P

Q:-49 $(Z + \bar{Z})^2$ is a
A) Complex number   B) Rational number
C) Real numbers   D) None of these

Q:-50 Any subset of $A \times B$ is called a
A) binary relation   B) binary operation
C) function   D) Cartesian Product

Q:-51 If two vectors $\vec{a}$ and $\vec{b}$ are perpendicular then.....
a) $\vec{a} \times \vec{b} = 0$ b) $\vec{a} \cdot (\vec{b} \times \vec{a}) = 0$
c) $\vec{a} = 0$ d) $\vec{a} \cdot \vec{b} = 0$

Q:-52 If $\vec{a} \times \vec{b} = 0$ and $\vec{a} \cdot \vec{b} = 0$ then....
a) both vectors are parallel   b) both vectors are perpendicular
c) either $\vec{a} = 0$ or $\vec{b} = 0$ d) both vectors are equal

Q:-53 Latusrectum of a parabola $x^2 = 4ay$ is
a) $x = a$ b) $x = -a$
c) $y = a$ d) $y = -a$

Q:-54 Eccentricity of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$
a) $e = \frac{c}{a}$ b) $e = \frac{c}{b}$
c) $e = c$ d) $e = ab$

Q:-55 Centre of circle $x^2 + y^2 + 8x + 4y + 9 = 0$ is
a) (4,2)   b) (-4,-2)
c) (2,4)   d) (-2,-4)

Q:-56 Khalid is currently twice as old as Waqas. If Khalid is currently ''r'' years old, How old was Waqas ten years ago ?

a)   r-10   b)   2r-10
c)   r/2 – 10   d)   2r-20

Q:-57 $\lim\limits_{h \to 0} \dfrac{\sqrt{x+h} - \sqrt{x}}{h}$

a) ∞ b)   0

c) $\dfrac{1}{2\sqrt{x}}$ d)   1

Q:-58 Normal form of equation of straight line is
a) $ax + by = 0$ b) $x\cos\alpha + y\sin\beta = p$

c) $\dfrac{x}{a} + \dfrac{y}{b} = 1$ d) $y = mx + c$

Q:-59 Domain of $f(x) = 2 + \sqrt{x-1}$, $\forall x \in \mathbf{R}$ is
A) $\mathbf{R}$ B) $(1, \infty)$
C) $[2, \infty)$ D) $[1, \infty)$

Q:-60 $\int \tan(ax + b)dx =$
a) $-1/a \, ln|\cos \Box ax + b)\Box| + c$ b) $-1/a \, ln|\sin \Box(ax + b)\Box| + c$
c) $1/a \, ln|\cos \Box(ax + b)\Box| + c$ d) $1/a \, ln|\sin \Box(ax + b)\Box| + c$

Q:-61 $\lim\limits_{x \to a} \dfrac{x^n - a^n}{x - a}$
A) na^{n-1} B) a
C) ∞ D) na

Q:-62 The parametric equation $x = r\cos q$, $y = r\sin q$ represent a
A)   a Parabola   B)   an Ellipse
C)   a circle   D)   a hyperbola

Q:-63 If $y = e^{f(x)}$ then $\dfrac{dy}{dx} =$
A) $e^{f(x)}$ B) $e^{f(x)} f'(x)$

C) $\dfrac{e^{f(x)}}{f'(x)}$ D)   None of these

Q:-64 $\dfrac{d}{dx} \int f(x)dx =$
A)   f'(x)   B)   f(x)

C) $\int_{\Box}^{\Box}$ f(y)   D)   f(x) dx

Q:-65 Solution of Differential equation $\dfrac{dy}{dx} + 2xy = 0$ is
A) $y = ce^x$ B) $lny + x^2 = c$
C) $lny + 2x^2 = c$ D)   None of these

Q:-66 The centroid of $\triangle ABC$ divides each median in the ratio
A)   1:2   B)   2:1

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C)   2:2   D)   1:1

Q:-67 $y -y_1 =m(x -x_1)$ represents
A)   Slope intercept form   B)   Normal Form
C)   Two points form   D)   Point slope form

Q:-68   Given lines $2x +y -3 =0$, $4x +2y -5 =0$ are
A)   Parallel   B)   Perpendicular
C)   Tangent lines   D)   None of these

Q:-69   The corner point for $x - 2y \leq 6$ and $x + 2y \leq 10$ is
A)   (8,1)   B)   (2,3)
C)   (-2,6)   D)   None of these

Q:-70   If $x^2 +y^2 +2gx +2 fy +c =0$ is an equation of the circle then its radius is
A) $\sqrt{g^2 + f^2 + c}$ B) $\sqrt{g^2 + f^2 - c}$
C) $g +f + c$ D) $g +f -c$

Section II: English

Q:-71   There are _____ hotels in the desert.
A)   not many   B)   best   C)   this   D)   little

Q:-72   if I _____ you, I'd take the risk.
A)   am   B)   have been   C)   were   D)   would be

Q:-73   The glass _____ water is on the table.
A)   to   B)   of   C)   with   D)   a

Q:-74   We are going to a party at the Shen's house. _____ house is on Fifth Street.
A)   Our   B)   This   C)   A   D)   her

Q:-75   Peter, you can have ice cream _____ you eat your dinner.
A   before   B)   until   C)   after   D)   since

Q:-76   Once upon a time, ____three bears who lived in a forest in a little red house near a brook.
A)   were   B)   was   C)   are   D)   there were

Q:-77   _____ you like? I like grapes and figs.
A)   What kind of fruit   B)   How many fruit do
C)   Types of fruit do   D)   What type of fruit do

Q:-78   _____ the answer? Yes, the answer is twenty eight.
A)   Know you   B)   Do you know
C)   Are you knowing   D)   You know

Q:-79 _____ your new job?
A)   Do you like   B)   Like
C)   Are you liked by   D)   Like you

Q:-80 Do you ever talk to _____?
A)   myself   B)   herself   C)   yourself   D)   themselves

Q:-81 Anna told me a very _____ story.
A)   interestingly   B)   interesting   C)   interests   D)   interested

Q:-82 Choose the CORRECT RESPONSE: Is it hot or cold in August?_____
A)   In August is hot.   B)   It is hot in August
C)   It makes very hot in August   D)   It is heat in August

Q:-83 Choose the CORRECT RESPONSE: Do you brush your teeth after every meal? _____
A)   I twice a day brush my teeth   B)   I always brushing my teeth
C)   Yes, I do.   D)   Yes, I brush the teeth every meal.

Q:-84 Choose the CORRECT RESPONSE: Aren't they coming with us to the party? _____
A)   No, they're not coming   B)   No, they are going with she
C)   No, they are coming in the party later
D)   Yes, they is coming with us

Q:-85 Choose the CORRECT RESPONSE: (Jack is making trouble) _____
A)   Stop to make trouble Jack!   B)   Is to be good Jack!
C)   Not to make trouble Jack!   D)   Be good Jack!

Q:-86 Choose the CORRECT RESPONSE: Where were you yesterday? _____
A)   I were with my friends at the movies
B)   I was with he and she   C)   I wasn't in town.
D)   I wasn't to the office

Q:-87 Choose the CORRECT RESPONSE: Which books are yours: these or those? _____
A)   Those are my books, and these are yours.   B)   Mine books are these
C)   They are mine   D)   These books are mine; those are of John.

Q:-88 Choose the CORRECT RESPONSE: How much is a plane ticket to Rio de Janeiro?__
A)   It's not much   B)   Oh, it's very very
C)   It is many money.   D)   It's most than a ticket to Hong Kong.

Q:-89 Choose the CORRECT RESPONSE: How was the movie last night? _____
A)   Was fantastic   B)   It was better than his first movie
C)   It was a action movie   D)   The movie was science fiction kind.

Q:-90 If you _____ to town tomorrow, will you do some shopping for me?
A)   go   B)   will be going C)   went   D)   will go

Q:-91 Omit is most similar to
A)   recluse   B)   mistake   C)   neglect   D)   destroy

Q:-92 As the wood wolves howled, Alia and Ali found it difficult to see in the gloomy
forest. What is an antonym of 'gloomy'?
A)   dark   B)   ominous   C)   bright   D)   dreadful

Q:-93 Choose the correct sentence
A)   That's a brown, attractive leather coat
B)   That's a brown leather coat attractive

C)   That's an attractive leather brown coat
D)   That's an attractive brown leather coat

Q:-94 If they _____ the examination, they'll all be very happy.
A)   pass   B)   would pass   C)   passed   D)   will pass

Q:-95 Which is the correct way to write the following? $1 + 1 = 2$
A)   one plus one is two   B)   one more one equals two
C)   one plus one, two   D)   one more one is two

Q:-96 Choose the CORRECT QUESTION: _____? I'm going to work.
A)   Why are you going?   B)   Were are you going?
C)   Where you going?   D)   Where are you going?

Note: Read the paragraph and choose the correct missing words. (for Q:-97-100)

Andy Wasnick loved the idea. Mary Arthur __97__ it. Kurt Mendez didn't think it was any big deal. Mr. El thought it was a brilliant idea. After all, it was __98__ idea. "It's only fair," Mr. El explained to his new fourth graders as they stood in line waiting for the lunch bell to ring, "that we turn things around. Every year you guys line up in alphabetical __99__ to go to lunch, to go to gym, to go home, and so on. This __100__ we're using reverse alphabetical order."

Q:-97 The correct word would be
A)   heard   B)   liked   C)   needed   D)   hated

Q:-98 The correct word would be
A)   that   B)   no   C)   her   D)   his

Q:-99 The correct word would be
A)   letters   B)   soup   C)   order   D)   index

Q:-100 The correct word would be
A)   way   B)   year   C)   alphabet   D)   is