**SET NO .3**

**Exam ID.** | | | | | | |

**Candidates must write the Set No. on the title page of the OMR Sheet.**

# DAV PUBLIC SCHOOLS, ODISHA ZONE –I
# PA-II EXAMINATION, 2021-22

- **Check that this question paper contains 07 printed pages.**
- **Set number given on the right-hand side of the question paper should be written on the OMR SHEET by the candidate.**
- **Check that this question paper contains 50 questions.**

## CLASS – XI
## SUB : MATHEMATICS (041)

**Time :90 Minutes** **Maximum Marks: 40**

**General Instruction:**

1. *This question Paper contains three sections-A, B and C. Each part is compulsory.*
2. ***Section –A** has 20 MCQs, attempt any **16 out of 20.***
3. ***Section –B** has 20 MCQs, attempt any **16 out of 20.***
4. ***Section –C** has 10 MCQs, attempt any **8 out of 10.***
5. *There is no negative marking.*
6. *All questions carry equal marks.*

## SECTION – A

**(Section A consists of 20 questions of each 1mark weightage. Any 16 questions are to be attempted. The first attempted 16 questions would be evaluated.)**

**Q1.** **Let A = {5,6} and B = {7,6}, the number of relation from A to B is** 1

A. 4 B. 16

C. 32 D. 64

**Q2.** **If (x+3,5) = (6,2x+y), then the value of x and y is** 1

A. 3,1 B. 3,-1

C. -3,1 D. -3,-1

**Q3.** **The variance of the first 5 natural numbers is** 1

A. 1 B. 2

C. 3 D. 4

**Q4.** **The range of f(x) = $2-(x-3)^2$ is** 1

A. $(-\infty,2]$ B. $[2,\infty)$

C. $(2,\infty)$ D. $(-2,\infty)$

**Q5.** **If f(x) = $x^3-\frac{1}{x^3}$ , then the value of f(x) + f$\left(\frac{1}{x}\right)$ is** 1

A. 0 B. $2x^3$

C. $3x^3$ D. $2/x^2$

**Q6.** **Let A,B are two sets. If A ∩ X = B ∩ X = ∅ and A ∪ X =B∪ X , for some set X, then** 1

A. A = B B. A ≠B

C. A ∩ B=∅ D. A – B ≠ ∅

**Q7.** **The relation f defined by f(x)=$\begin{cases} x^2 & 0 \le x \le 2 \\ 3x & 2 \le x \le 10 \end{cases}$ is** 1

A. a function B. both relation and function

C. not a function D. not a relation

**Q8.** **Let f = {(1,1),(2,3),(0,-1),(-1,-3)} be a function from Z to Z defined by f(x) = ax + b , for some integers a and b, then value of a and b are** 1

A. 1,0 B. -1,0

C. -1,2 D. 2,-1

**Q9.** **The value of $i^{4n-3}$, n∈ Z is** 1

A. -i B. I

C. 1 D. -1

**Q10.** **If z = $2+\sqrt{3}\,i$ then the value of the multiplicative inverse of z is** 1

A. $\frac{2-\sqrt{3}\,i}{7}$ B. $\frac{2+\sqrt{3}\,i}{7}$

C. 1 D. $\sqrt{7}$

**Q11.** **The value of $i^{143}+i^{144}+i^{145}+i^{146}$ is** 1

A. 0 B. 1

C. -1 D. i

**Q12.** **If $x - iy = \frac{a+ib}{a-ib}$, then the value of $x^2 + y^2$** 1

A. 1 B. -1

C. 0 D. $a^2 + b^2$

**Q13.** **If $\alpha, \beta$ are different complex numbers with $|\beta| = 1$, then the value of $\left|\frac{\beta-\alpha}{1-\bar{\alpha}\beta}\right|$ is** 1

A. 1 B. 0

C. $\alpha^2 + \beta^2$ D. $\alpha^2 - \beta^2$

**Q14.** **The value of $\lim_{x\to 0} \frac{\sin 3x}{\tan 5x}$ is** 1

A. 3/5 B. 5/3

C. 1 D. Not defined

**Q15.** **For the function $f(x) = \begin{cases} a + bx & x < 1 \\ 4 & x = 1 \\ b - ax & x > 1 \end{cases}$, and if $\lim_{x\to 1} f(x) = f(1)$ The values of a and b are** 1

A. 0,4 B. 4,0

C. 1,-2 D. -1,-2

**Q16.** **If $f(x) = \begin{cases} \frac{|x|}{x} & x \neq 0 \\ 0 & x = 0 \end{cases}$ then $\lim_{x\to 0} f(x)$ is** 1

A. Exist B. does not exist

C. 1 D. -1

**Q17.** **The distance of the point (-2,-3) from the line 3x + 4y + 1 = 0 is** 1

A. $\frac{17}{5}$ B. $\frac{-17}{\sqrt{13}}$

C. $\frac{12}{5}$ D. 5

**Q18.** **If $\lim_{x\to 0} \frac{x}{\sqrt{x+1}-1}$ exist, then the value of the limit is** 1

A. 2 B. $\log_e 2$

C. -2 D. $-\log_e 2$

**Q19.** **The distance between the lines 3x+4y+5=0 and 6x+8y+10=0 is** 1

A. $\frac{7}{5}$ B. 1

C. $\frac{12}{5}$ D. 0

**Q20.** **In a GP the tenth term is 9, the fourth term is 4 and 1st term is $\frac{8}{3}$, then the 7th term is** 1

A. 6 B. -6

C. 9 D. -9

## SECTION – B

**(Section B consists of 20 questions (21 – 40) of each 1mark weightage. Any 16 questions are to be attempted. The first attempted 16 questions would be evaluated.)**

**Q21** **If $7^{\frac{1}{2}}.7^{\frac{1}{4}}.7^{\frac{1}{8}}\ldots.(\text{to}\ \infty) = \left(\sqrt{7}\right)^{x}$, then the value of x is** 1

A. $\frac{1}{2}$ B. 4

C. 2 D. 0

**Q22.** **If pth , qth and rth terms of a GP area , b and c respectively. Then the value of $a^{q-r} \times b^{r-p} \times c^{p-q}$ is** 1

A. 1 B. 0

C. -1 D. a

**Q23.** **If $\frac{a^{n+1}+b^{n+1}}{a^{n}+b^{n}}$ may be the G.M between a and b. then the value of n is** 1

A. 1 B. -1

C. $\frac{1}{2}$ D. $\frac{-1}{2}$

**Q24.** **If the sum of n terms of an AP is $nP - \frac{1}{2}n(n-1)Q$, where P and Q are constants, then the common difference is** 1

A. P-Q B. Q

C. P D. P+Q

**Q25.** **The range of signum function is** 1

A. {-1,0,1} B. {1,-1}

C. Z,{-1,0,1} D. Z,{-1,1}

**Q26.** **Let f :R→R be given by $f(x) = x^2 + 3$ ,then the pre-images of 2 under f is** 1

A. {-1,1} B. {+1,-1,0}

C. {1} D. Does not exist

**Q27.** **In a school there are 20 teachers who teach Mathematics or Physics. Of these 8 teach only mathematics and 4 teach both physics and mathematics. Then teacher teaches physics only is** 1

A. 16 B. 8

C. 4 D. -12

**Q28.** **If $z = \frac{1+2i}{1-i}$ , then z lies in the** 1

A. I quadrant B. II quadrant

C. III quadrant D. IV quadrant

**Q29.** **The solution of $x^2 + \frac{x}{\sqrt{2}}+1=0$ are** 1

A. $\frac{-1\pm\sqrt{7}i}{2\sqrt{2}}$ B. $\frac{-1+\sqrt{7}i}{2\sqrt{2}}$

C. $\frac{-1\pm\sqrt{7}i}{\sqrt{2}}$ D. $\frac{-1\pm\sqrt{3}i}{2\sqrt{2}}$

**Q30.** **The value of $\sum_{k=1}^{11}(2 + 3^k)$ is** 1

A. $22+\frac{3}{2}(3^{11}-1)$ B. $22+\frac{3}{2}(3^{11}+1)$

C. $22+\frac{5}{2}(3^{11}-1)$ D. $44+\frac{3}{2}(3^{11}-1)$

**Q31.** **If a,b and c are in G.P and $a^{\frac{1}{x}} = b^{\frac{1}{y}} = c^{\frac{1}{z}}$ then x, y,z are in** 1

A. A.P B. G.P

C. Both A.P and G.P D. Neither A.P nor G.P

**Q32.** **If A and G be respectively A.M and G.M between two positive numbers. Then numbers are** 1

A. $A\pm\sqrt{A^2+G^2}$ B. $A\pm\sqrt{A^2-G^2}$

C. $-A\pm\sqrt{A^2+G^2}$ D. $-A-\sqrt{A^2+G^2}$

**Q33.** **The line passing through the point $(x_1, y_1)$ and parallel to ax+by+c=0 is** 1

A. $a(x-x_1)+b(y-y_1)=0$ B. $a(x-x_1)-b(y-y_1)=0$

C. $-a(x-x_1)+b(y-y_1)=0$ D. $-a(x-x_1)-b(y-y_1)=0$

**Q34.** **If N=10, $\sum x=60$ and $\sum x^2=1000$ then standard deviation is** 1

A. -8 B. 8

C. $\pm 8$ D. 0

**Q35.** **The variance of 10 observations is 4. If each observation is multiplied by 3, then the variance of the new data is** 1

A. 36 B. -36

C. 6 D. 19

**Q36.** **The value of $\lim_{x\to 0}\frac{e^{5x}-e^x}{x}$ is** 1

A. 4 B. -3

C. 2 D. 0

**Q37** **The ratio in which line joining (-4,2) and (2,1) is divided externally by x-axis is** 1

A. 1:2 B. 2:1

C. -1:2 D. 1:-2

**Q38.** **The mean of first n natural numbers is** 1

A. $\frac{n+1}{2}$ B. $\bar{n}$

C. $\frac{n(n+1)}{2}$ D. n

**Q39.** **The slope of the line which passes through the origin and the midpoint of the segment joining the points (0,-4) and (8,0) is** 1

A. 2 B. $-\frac{1}{2}$

C. -2 D. -4

**Q40.** **The variance of 20 observations is 6.5. If each observation is increased by 4, then the new variance is** 1

A. 10.5 B. 2.5
C. 6.5 D. 2.6

## SECTION – C

**(Section C consists of 10 questions of each 1mark weightage. Any 08 questions are to be attempted. Questions 46 – 50 are based on a Case- Study. The first attempted 08 questions would be evaluated.)**

**Q41.** **The mean of the 10 observations is 18. If each observation is increased by 2, then the new mean is** 1

A. 20 B. 38
C. 16 D. 12

**Q42.** **The mean of the 7 observations is 25. If 3 is subtracted from each observation, then the new mean is** 1

A. 21 B. 22
C. 23 D. 28

**Q43.** **The set builder form of {1,-1.i,-i} is** 1

A. $x^4 - 1 = 0$ B. $x^2 - 1 = 0$
C. $x^2 + i = 0$ D. $x^2 - i = 0$

**Q44.** **The value of $\lim_{x\to 0} \frac{\sqrt{x+1}-1}{\log(1+x)}$ is** 1

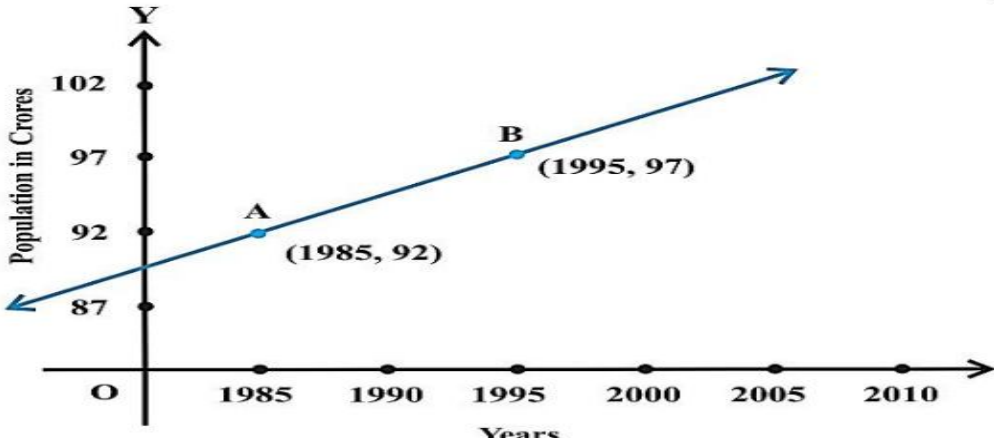
A. 2 B. 4
C. $\frac{1}{2}$ D. $-\frac{1}{2}$

**Q45.** **The domain of the function f(x) =$\sqrt{9 - x^2}$ is** 1

A. R B. [0,3]
C. [-3,3] D. (-3,3)

**Questions 46-50 are based on a Case-Study.**

Consider the following population and year graph.




Based on the above information answer the following

**Q46.** **The slope of the line AB is** 1

A. 2 B. 2

C. $\frac{1}{3}$ D. $\frac{1}{2}$

**Q47.** **The equation of line AB is** 1

A. x+2y=1791 B. x-2y=1801

C. x-2y=1791 D. x-2y+1801=0

**Q48.** **The population in the year 2010 is (in crores)** 1

A. 104.5 B. 119.5

C. 109.5 D. None

**Q49.** **The equation of line perpendicular to line AB and passing through (1995, 97) is** 1

A. 2x-y=4087 B. 2x+y=4087

C. 2x+y=1801 D. None

**Q50.** **In which year the population becomes 110 crores.** 1

A. 2020 B. 2021

C. 2022 D. 2019

**********  ALL THE BEST  **********