O.S.D.A.V. Public School, Kaithal.
May Unit Test 2025-2026
Class : XI
Subject: Applied Mathematics

Set-A

Time 1 hr. 30 min. **M.M. 40**

General Instructions:

All questions are compulsory. This question paper has 5 sections. Section A has 11 questions of 1 mark each. Section B has 3 questions of 2 marks each. Section C has 3 questions of 3 marks each. Section D has 2 question of 5 mark each. Section E has 1 question of 4 marks.

SECTION - A

1. If log2 = 0.3010, log3 = 0.4771 than log 162 is equal to:
   a. 2.2951 b. 2.202951 c. 2.22951 d. 2.0951
2. $\text{Log}_7 \sqrt[3]{343}$ is equal to:
   a. 7 b. 3 c. 5 d. 1
3. If $16^{x+1} = \frac{64}{4^x}$ then x is equal to:
   a. $\frac{1}{3}$ b. 3 c. 4 d. 1
4. Log_x 81=4 then x is equal to:
   a. 4 b. 3 c. 1 d. 5
5. The binary number $(1101)_2$ is equal to:
   a. 7 b. 13 c. 23 d. 32
6. The decimal number 25 is equal to:
   a. $(11001)_2$ b. $(1001)_2$ c. $(11100)_2$ d. $(00111)_2$
7. If A = {1, 2, 3} then P(A) contains:
   a. 6 elements b. 8 elements c. 3 elements d. 5 elements
8. The odd one out of the series 9, 16, 25, 36, 125, 169, 196, 225 is:
   a. 16 b. 169 c. 225 d. 125
9. A is D's brother. D is B's father. B and C are sisters. How is C related to A?
   a. Sister b. Mother c. Niece d. Daughter

The following questions consist of two statements – Assertion (A) and Reason(R). Answer these questions selecting the appropriate option given below:

a. Both A and R are true and R is the correct explanation for A.

b. Both A and R are true but R is not the correct explanation for A.

c. A is true but R is false. d. A is false but R is true.

10. Assertion: A = {a, b} and B = {a, b, c} then A $\not\subset$ B
Reason: If A $\subset$ B then A $\cup$ B = B

11. Assertion: R = {(1, 2), (1, 3), (1, 4)} is a Relation on the set {1, 2,3}
Reason: For any two sets A & B, any subset of A x B is a relation from A to B.

SECTION - B

12. If A = {1, 2, 3,4, ... 14} and a relation R is defined from A to A by
R = {(x, y) : 3x – y = 0, x, y $\in$ A}
i. Write R in roster form
ii. Write its domain and range.

13. Given log3= 0.4771. Find number of digits in 3^{62}.

14. Check whether $(11\ 10\ 10)_2$ is even or odd.

SECTION - C

15. If $a^x = b$, $b^y = c$, $c^z = a$, Prove that xyz = 1.

16. If A = {2,4,6,8,10}, B = {1,2,3,4,5,6,7} C = {2, 6, 7,10} then show that
A$\cup$(B $\cap$ C) = (A $\cup$ B) $\cap$ (A $\cup$ C)

17. Show that $(1\frac{1}{20})^{100} > 100$

SECTION - D

18. Find the approximate value of:
$$\frac{(3.142)^3 x\ (0.078)^{113}}{(0.005)^{114}}$$

19. Find n if $\frac{x^n + y^n}{x^{n-1} + y^{n-1}} = \sqrt{xy}\ , x \neq y$

SECTION - E

20. In a survey of 25 students, it was found that 15 has taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Mathematics and Chemistry, 9 had taken Mathematics and Physics, 4 had taken Physics and Chemistry and 3 had taken all three subjects. Find the number of students who had:
i. Only Chemistry ii. Physics and Chemistry but not Mathematics
iii. At least one of three subjects iv. None of three subjects

O.S.D.A.V. Public School, Kaithal.
May Unit Test. 2025-2026
Class : XI
Subject: Applied Mathematics

Set-B

Time 1 hr. 30 min. **M.M. 40**

General Instructions:

All questions are compulsory. This question paper has 5 sections. Section A has 11 questions of 1 mark each. Section B has 3 questions of 2 marks each. Section C has 3 questions of 3 marks each. Section D has 2 question of 5 mark each. Section E has 1 question of 4 marks.

SECTION - A

1. Which of the following binary number is equivalent to decimal number 150?
   a. $(10010110)_2$ b. $(100000)_2$ c. $(10001010)_2$ d. $(100001)_2$
2. $\text{Log}_7 \sqrt[3]{343}$ is equal to:
   a. 7 b. 3 c. 5 d. 1
3. $\text{Log}_x 81=4$ then x is equal to:
   a. 4 b. 3 c. 1 d. 5
4. $\frac{3^{2x-8}}{225} = \frac{5^3}{5^x}$, then value of x is:
   a. 1 b. 2 c. 5 d. 7
5. The binary number $(1101)_2$ is equal to:
   a. 7 b. 13 c. 23 d. 32
6. The decimal number 25 is equal to:
   a. $(11001)_2$ b. $(1001)_2$ c. $(11100)_2$ d. $(00111)_2$
7. If A = {1, 2, 3} then P(A) contains:
   a. 6 elements b. 8 elements c. 3 elements d. 5 elements
8. The odd one out in the series 1, 1, 2, 6, 24, 96, 720 is:
   a. 2 b. 6 c. 24 d. 96
9. If 3 x 1 = 20, 6 x 1 = 50 and 2 x 6 = -40 then 5 x 8 is:
   a. 20 b. -30 c. 70 d. -10

The following questions consist of two statements – Assertion (A) and Reason(R). Answer these questions selecting the appropriate option given below:

a. Both A and R are true and R is the correct explanation for A.
b. Both A and R are true but R is not the correct explanation for A.
c. A is true but R is false.
d. A is false but R is true.

10. Assertion: R = {(1, 2), (1, 3), (1, 4)} is a Relation on the set {1, 2,3}
Reason: For any two sets A & B, any subset of AxB is a relation from A to B.

11. Assertion: A = {a, b} and B = {a, b, c} then A $\not\subset$ B
Reason: If A $\subset$ B then A ∪ B = B

Section B

12. Check whether $(11\ 10\ 10)^2$ is even or odd.

13. Given Log2 = 0.3010. Find the number of digits in 2^{64}.

14. If A = {1, 2, 3,4, ... 14} and a relation R is defined from A to A by
R = {(x, y) : 3x – y = 0, x, y ∈ A}
i. Write R in roster form
ii. Write its domain and range.

Section C

15. If $a^x = b^y = c^z = d^w$ and ab = cd. Show that $\frac{1}{x}+\frac{1}{y}=\frac{1}{z}+\frac{1}{w}$

16. Show that $(1\frac{1}{20})^{100} > 100$

17. If A = {2,4,6,8,10}, B = {1,2,3,4,5,6,7} C = {2, 6, 7,10} then show that
A ∪ B (B ∩ C) = (A ∪ B) ∩ (A ∪ C)

Section D

18. Find the approximate value of $\sqrt[3]{\frac{(45.4)^2}{(3.2)^2\ x\ (6.5)^3}}$

19. 19. Find n if $\frac{x^n+y^n}{x^{n-1}+y^{n-1}} = \sqrt{xy}, x \neq y$

Section E

20. In a survey of 25 students, it was found that 15 has taken Mathematics, 12 had taken Physics and 11 had taken Chemistry, 5 had taken Mathematics and Chemistry, 9 had taken Mathematics and Physics, 4 had taken Physics and Chemistry and 3 had taken all three subjects. Find the number of students who had:
i. Only Chemistry ii. Physics and Chemistry but not Mathematics
iii. At least one of three subjects iv. None of three subjects

Class XI

Applied Mathematics

May Unit Test (2025-26)

Marking Scheme

Set A

Note:- Any relevant solution not mentioned here in but correct will be suitably awarded.

Q. No.	Value points / Key points [Section A]	Value point	Total point
1	(b) 2.202951	1	1
2 2(B)	(d) 1	1	1
3 4(B)	(a) $\frac{1}{3}$	1	1
4	(b) 3	1	1
5 5(B)	(b) 13	1	1
6 6(B)	(a) $(11001)_2$	1	1
7. 7(B)	(b) 8 elements	1	1
8	(d) 125	1	1
9	(c) Niece	1	1
10 11(B)	(d) A is false R is true	1	1
11 10(B)	(a) Both A & R are true and R is correct explanation of A	1	1

Section B

12 $A = \{1, 2, 3, \ldots 143\}$

$R = \{(x, y) : 3x = y,\ x, y \in A\}$

14(B) $R = \{(1,3), (2,6), (3,9), (4,12)\}$ — 1

Domain $= \{1, 2, 3, 4\}$ — 1/2

Range $= \{3, 6, 9, 12\}$ — 1/2 — 2

13 Let $x = 3^{62}$

Taking log both sides — 1/2

$\log x = 62 \log 3$ — 1/2

$\log x = 62(0.4771)$

$\log x = 29.5802$ — 2

Thus Characteristic of $\log x$ is 29 — 1/2

No. of digits in x i.e $3^{62} = 29 + 1 = 30$ — 1/2

14 / 12(B) $(111010)_2$

$1 \times 2^5 + 1 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$ — 1

$32 + 16 + 8 + 0 + 2 + 0$ — 1/2

58 (Even) — 1/2 — 2

Section C

15 $a^x = b \quad b^y = c \quad c^z = a$ [given]

$b^y = c \Rightarrow b = c^{1/y}$

$c^z = a \Rightarrow c = a^{1/z}$ — 1

$a^x = b \Rightarrow a = b^{1/x}$

$a = (c^{1/y})^{1/x} = ((a^{1/z})^{\frac{1}{y}})^{\frac{1}{x}}$ — 1

$a^1 = a^{\frac{1}{xyz}} \Rightarrow \frac{1}{xyz} = 1$ or $xyz = 1$ — 1 — 3

16 B(17)

$A = \{2, 4, 6, 8, 10\}$, $B = \{1, 2, 3, 4, 5, 6, 7\}$

$C = \{2, 6, 7, 10\}$

T.P.

$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

L.H.S.

$\{2, 4, 6, 8, 10\} \cup \{2, 6, 7\}$ — 1½

$\{2, 4, 6, 7, 8, 10\}$

R.H.S.

$\{1, 2, 3, 4, 5, 6, 7, 8, 10\} \cap \{2, 4, 6, 7, 8, 10\}$ — 1½

$\{2, 4, 6, 7, 8, 10\}$

3

---

17 16(B)

T.P. $\left(1\frac{1}{20}\right)^{100} > 100$

Let $x = \left(\frac{21}{20}\right)^{100}$

Taking log both sides

$\log x = 100[\log 21 - \log 20]$ — 1/2

$\log x = 100[1.3222 - 1.3010]$ — 1/2

$\log x = 100[0.0212]$ — 1/2

$\log_{10} x = 2.12$ — 1/2

$x = (10)^{2.12} > 100$ — 1/2

$\therefore \left(1\frac{1}{20}\right)^{100} > 100$ — 1/2

3

18. Let

Section D

$$x = \frac{(3.142)^3 \times (0.078)^{1/3}}{(0.005)^{1/4}}$$

$$\log x = 3\log(3.142) + \frac{1}{3}\log(0.078) - \frac{1}{4}\log(0.005)$$ — 1

$$\log x = 3[0.4972] + \frac{1}{3}[\bar{2}.8921] - \frac{1}{4}[\bar{3}.6990]$$ — 1

$$= 1.4916 + \frac{1}{3}[\bar{3} + 1.8921] - \frac{1}{4}[\bar{4} + 1.6990]$$ — 1

$$1.4916 + \bar{1} + 0.6307 - \bar{1} - 0.4248$$ — 1

$$2.1223 - 0.4248 = 1.6975$$

$$\text{Antilog}(1.6975) = x$$

$$x = 49.83$$ — 1

5

19 / 19(B)

$$\frac{x^n + y^n}{x^{n-1} + y^{n-1}} \times \frac{\sqrt{xy}}{1}$$

$$x^n + y^n = x^{n-\frac{1}{2}} y^{1/2} + x^{1/2} y^{n-1/2}$$ — 1½

$$x^n + y^n - x^{n-1/2} y^{1/2} - x^{1/2} y^{n-\frac{1}{2}} = 0$$ — ½

$$x^{n-\frac{1}{2}}[x^{1/2} - y^{1/2}] = y^{n-\frac{1}{2}}[x^{1/2} - y^{1/2}]$$ — 1

$$\frac{x^{n-\frac{1}{2}}}{y^{n-\frac{1}{2}}} = 1$$ 1/2

$$\left(\frac{x}{y}\right)^{n-\frac{1}{2}} = \left(\frac{x}{y}\right)^{0}$$ 1/2 | 5

$$n - \frac{1}{2} = 0$$ 1/2

$$n = 1/2$$ 1/2

Section E

20 A : who had taken Maths

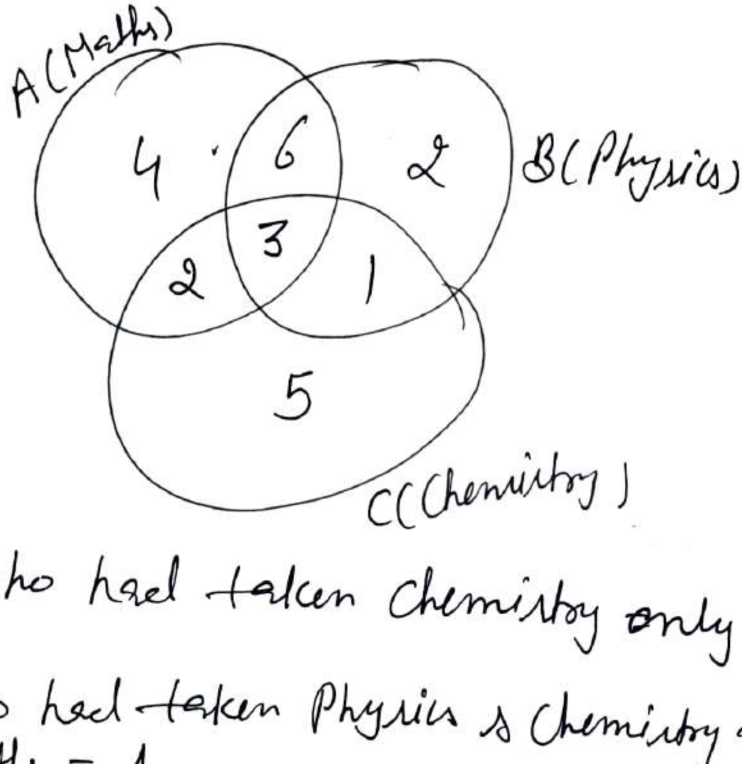
B : " " " Physics

C : " " " Chemistry

$n(A) = 15 \quad n(B) = 12 \quad n(C) = 11$

$n(A \cap C) = 5 \quad n(A \cap B) = 9 \quad n(B \cap C) = 4$ 1

$n(A \cap B \cap C) = 3$



1

(i) who had taken Chemistry only = 5 1/2

(ii) who had taken Physics & Chemistry not Maths = 1 1/2

i	(iii) At least one of three subjects :- $4+6+2+2+3+1+5 = 23$	1/2	2
	(iv) None of three subjects :- $25-23=02$	1/2	
	Different questions of Set B		
1.	(a) $(10010110)_2$	1	1
3	(a) 1	1	1
9	(b) -30	1	1
8	(d) $+96$	1	1
13	Let $x = 2^{64}$ $\log x = 64 \log 2$ $\log x = 64(0.3010)$ $= 19.2640$ Thus characteristic of $\log x = 19$ $\therefore$ Number of digits in $2^{64} = 20$	1/2 1/2 1/2 1/2	2
16	$a^x = b^y = c^z = d^w = k$ (let) $a = k^{1/x}$, $b = k^{1/y}$, $c = k^{1/z}$, $d = k^{1/w}$ $ab = cd$ $k^{1/x} \cdot k^{1/y} = k^{1/z} \cdot k^{1/w}$ $k^{\frac{1}{x}+\frac{1}{y}} = k^{\frac{1}{z}+\frac{1}{w}}$ $\therefore \frac{1}{x}+\frac{1}{y} = \frac{1}{z}+\frac{1}{w}$	1 1 1 1	3

18 Let $x = \sqrt[3]{\frac{(45.4)^2}{(3.2)^2 \times (6.5)^3}}$

$\log x = \frac{1}{3}\left[\log(45.4)^2 - \log(3.2)^2 + 3\log(6.5)\right]$ 1

$= \frac{1}{3}\left[2\log 45.4 - 2\log 3.2 - 3\log 6.5\right]$

$= \frac{1}{3}\left[2 \times 1.6571 - 2 \times 0.5051 - 3 \times 0.8129\right]$ 1 5

$= \frac{1}{3}\left[3.3142 - 1.0102 - 2.4387\right]$ 1

$= \frac{1}{3}\left[3.3142 - 3.4489\right]$

$= \frac{1}{3}\left[-0.1347\right]$

$= -0.0449$ 1

$= -1 + 1 - 0.0449$

$= -1 + 0.9551$

$= \bar{1}.9551$

$x = \text{Antilog}(\bar{1}.9551) = 0.9018$ 1