

CLASS : 10th (Secondary)

1954/1904

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MARKING INSTRUCTIONS AND MODEL ANSWERS

MATHEMATICS

(Only for Blind Candidates)

(Academic/Open)

(Only for Fresh Candidates)

उप परीक्षक मूल्यांकन निर्देशों का ध्यानपूर्वक अवलोकन करके उत्तर-पुस्तिकाओं का मूल्यांकन करें। यदि परीक्षार्थी ने प्रश्न पूर्ण व सही हल किया है तो उसके पूर्ण अंक दें।

General Instructions :

- (i) *Examiners are advised to go through the general as well as specific instructions before taking up evaluation of the answer-books.*
- (ii) *Instructions given in the marking scheme are to be followed strictly so that there may be uniformity in evaluation.*
- (iii) *Mistakes in the answers are to be underlined or encircled.*
- (iv) *Examiners need not hesitate in awarding full marks to the examinee if the answer/s is/are absolutely correct.*

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- (v) *Examiners are requested to ensure that every answer is seriously and honestly gone through before it is awarded mark/s. It will ensure the authenticity as their evaluation and enhance the reputation of the Institution.*
 - (vi) *A question having parts is to be evaluated and awarded partwise.*
 - (vii) *If an examinee writes an acceptable answer which is not given in the marking scheme, he or she may be awarded marks only after consultation with the head-examiner.*
 - (viii) *If an examinee attempts an extra question, that answer deserving higher award should be retained and the other scored out.*
 - (ix) *Word limit wherever prescribed, if violated upto 10%. On both sides, may be ignored. If the violation exceeds 10%, 1 mark may be deducted.*
 - (x) *Head-examiners will approve the standard of marking of the examiners under them only after ensuring the non-violation of the instructions given in the marking scheme.*
 - (xi) *Head-examiners and examiners are once again requested and advised to ensure the authenticity of their evaluation by going through the answers seriously, sincerely and honestly. The advice, if not headed to, will bring a bad name to them and the Institution.*
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महत्वपूर्ण निर्देश :

- (i) अंक योजना का उद्देश्य मूल्यांकन को अधिकाधिक वस्तुनिष्ठ बनाना है। अंक-योजना में दिए गए उत्तर-बिन्दु अंतिम नहीं हैं। ये सुझावात्मक एवं सांकेतिक हैं। यदि परीक्षार्थी ने इनसे भिन्न, किन्तु उपयुक्त उत्तर दिए हैं तो उसे उपयुक्त अंक दिए जाएँ।
- (ii) शुद्ध, सार्थक एवं सटीक उत्तरों को यथायोग्य अधिमान दिया जाए।
- (iii) परीक्षार्थी द्वारा अपेक्षा के अनुरूप सही उत्तर लिखने पर उसे पूर्ण अंक दिए जाएँ।
- (iv) वर्तनीगत अशुद्धियों एवं विषयांतर की स्थिति में अधिक अंक देकर प्रोत्साहित न करें।
- (v) भाषा-क्षमता एवं अभिव्यक्ति-कौशल पर ध्यान दिया जाए।
- (vi) मुख्य-परीक्षकों/उप-परीक्षकों को उत्तर पुस्तिकाओं का मूल्यांकन करने के लिए केवल Marking Instruction/ guideline दी जा रही है, यदि मूल्यांकन निर्देश में किसी प्रकार की त्रुटि हो, प्रश्न का उत्तर स्पष्ट न हो, मूल्यांकन निर्देश में दिए गए उत्तर से अलग कोई और भी उत्तर सही हो तो परीक्षक, मुख्य-परीक्षक से विचार विमर्श करके उस प्रश्न का मूल्यांकन अपने विवेक अनुसार करें।

SECTION – A

1. (i) Ans : (D) $5 + \sqrt{5}$ 1
- (ii) Ans : (B) 24 1
- (iii) Ans : (C) 3 1
- (iv) Ans : (B) -2 1
- (v) Ans : (A) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ 1
- (vi) Ans : (C) $x^2 - 6x = x(x - 3)$ 1
- (vii) Ans : (A) 45 1
- (viii) Ans : (C) 245 1
- (ix) Ans : (A) $\sqrt{x^2 + y^2}$ 1
- (x) Ans : (D) (3, 2) 1
- (xi) Ans : (B) $\frac{5}{13}$ 1

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(xii) Ans : (A) $\frac{3}{4}$ 1

(xiii) Ans : (B) $\frac{132}{7} \text{ cm}^2$ 1

(xiv) Ans : (C) $\frac{539}{3} \text{ cm}^2$ 1

(xv) Ans : (A) $\frac{1}{3}$ 1

(xvi) Ans : (D) 1 1

SECTION – B

2. Sol. : By Division algorithm

$$867 = 255 \times 3 + 102$$

$$255 = 102 \times 2 + 51 \quad 1$$

$$102 = 51 \times 2 + 0$$

$$\therefore \text{H C F (867, 255)} = 51 \quad 1$$

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3. Sol. :

$$\begin{array}{r} -x^2 + x - 1 \quad \overline{) -x^3 + 3x^2 - 3x + 5} \quad (x - 2 \\ \underline{x^3 x^2 x 5} \\ 2x^2 - 2x + 5 \\ \underline{2x^2 2x 2} \\ 3 \\ \underline{3} \end{array}$$

Division Algorithm :

$$\begin{aligned} & \text{Divisor} \times \text{Quotient} + \text{Remainder} \\ &= (-x^2 + x - 1) (x - 2) + 3 \\ &= -x^3 + x^2 - x + 2x^2 - 2x + 2 + 3 \\ &= -x^3 + 3x^2 - 3x + 5 \qquad \qquad \qquad 1 \\ &= \text{Dividend} \end{aligned}$$

4. Sol. : Let a be the first term and d be the common difference

Here $a_3 = 16$

$$a + 2d = 16 \dots\dots\dots (i)$$

and $a_7 = a_5 + 12$

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$$a + 6d = a + 4d + 12$$

$$6d - 4d = 12$$

$$d = 12/2 \Rightarrow 6$$

1

Putting $d = 6$ in (i), we get

$$a + 2 \times 6 = 16$$

$$a = 16 - 12$$

$$a = 4$$

\therefore A. P. is 4, 10, 16, 22

1

5. Sol. : $\sin (A - B) = \frac{1}{2}$

or $A - B = 30^\circ$ (i)

and $\cos (A + B) = \frac{1}{2}$

1

or $A + B = 60^\circ$ (ii)

from (i) & (ii) we get

$A = 45^\circ$ and $B = 15^\circ$

1

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6. Sol. :

Daily Wages	f	x	x × f
100-120	12	110	1320
120-140	14	130	1820
140-160	8	150	1200
160-180	6	170	1020
180-200	10	190	1900
	50		7260

$$\text{Mean } (\bar{x}) = \frac{\Sigma x \times f}{\Sigma f} = \frac{7260}{50} \Rightarrow \text{Rs. } 145.20$$

1

1

SECTION – C**7. Sol. :** Let Ravi answer x questions correctly and y questions incorrectly.

$$\text{ATQ } 3x - y = 40 \dots\dots\dots (i)$$

$$\text{and } 4x - 2y = 50 \dots\dots\dots (ii)$$

1

Multiplying (i) by 2 and subtracting (ii), we get

$$2x = 30 \Rightarrow x = 15$$

1

$$\text{from (i) } 3 \times 15 - y = 40$$

$$\text{or } y = 5$$

1

 \therefore Total no. of questions in the test are

$$15 + 5 = 20$$

1

8. Sol. : Let $\frac{1}{x} = m$ and $\frac{1}{y} = n$

then the equations become

$$\frac{1}{2}m + \frac{1}{3}n = 2 \Rightarrow 3m + 2n = 12 \dots\dots\dots (i)$$

$$\text{and } \frac{1}{3}m + \frac{1}{2}n = \frac{13}{6} \Rightarrow 2m + 3n = 13 \dots\dots\dots (ii) \quad 1$$

Multiplying (i) by 2 and (ii) by 3, we get

$$6m + 4n = 24 \dots\dots\dots (iii)$$

$$6m + 9n = 39 \dots\dots\dots (iv)$$

by subtracting, we get

$$-5n = -15 \Rightarrow n = 3 \quad 1$$

Putting $n = 3$ in (i) we get

$$3m + 2 \times 3 = 12$$

$$3m = 12 - 6 \quad 1$$

$$\text{or } m = 2$$

$$\text{Now } m = 2 \Rightarrow \frac{1}{x} = 2 \quad \text{or } x = \frac{1}{2}$$

$$\text{and } n = 3 \Rightarrow \frac{1}{y} = 3 \quad \text{or } y = \frac{1}{3} \quad 1$$

- 9. Sol. :** Let $P(x, y)$ be equidistant from the points $A(7, 1)$ and $B(3, 5)$

We are given that $AP = BP$

$$\text{so } AP^2 = BP^2 \quad 1$$

$$(x - 7)^2 + (y - 1)^2 = (x - 3)^2 + (y - 5)^2$$

$$x^2 + 49 - 14x + y^2 + 1 - 2y = x^2 + 9 - 6x + y^2 + 25 - 10y \quad 2$$

$$-14x + 6x - 2y + 10y = 34 - 50$$

$$-8x + 8y = -16$$

$$\text{or } x - y = 2 \quad 1$$

- 10. Sol. :** Let $A(3, 0)$, $B(4, 5)$, $C(-1, 4)$ and $D(-2, -1)$ be the vertices of the rhombus ABCD.

$$\begin{aligned} \text{Diagonal } AC &= \sqrt{(-1 - 3)^2 + (4 - 0)^2} \\ &= \sqrt{16 + 16} \\ &= 4\sqrt{2} \quad 1 \end{aligned}$$

$$\begin{aligned} \text{and Diagonal } BD &= \sqrt{(-2 - 4)^2 + (-1 - 5)^2} \\ &= \sqrt{36 + 36} \\ &= 6\sqrt{2} \end{aligned}$$

$$\text{Area of rhombus ABCD} \quad 1$$

$$= \frac{1}{2} \times (\text{Product of lengths of diagonals})$$

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$$= \frac{1}{2} \times AC \times BD \quad 1$$

$$= \frac{1}{2} \times 4\sqrt{2} \times 6\sqrt{2}$$

$$= 24 \text{ sq. units} \quad 1$$

11. Sol. : Here $r = 21 \text{ cm}$, $\theta = 60^\circ$

(i) Length of the arc $= \frac{\theta}{180} \times \pi r$

$$= \frac{60}{180} \times \frac{22}{7} \times 21$$
$$= 22 \text{ cm} \quad 2$$

(ii) Area of the sector $= \frac{\theta}{360} \times \pi r^2$

$$= \frac{60}{360} \times \frac{22}{7} \times 21 \times 21$$
$$= 231 \text{ cm}^2 \quad 2$$

12. Sol. : In a single throw of die, we can get any one of the six numbers 1, 2, 3, 4, 5, 6,

\therefore Total no. of elementary events = 6

(i) Prime numbers are 2, 3, 5

$$\therefore P(\text{getting a prime number}) = \frac{3}{6} \Rightarrow \frac{1}{2} \quad 2$$

(ii) The even numbers are 2, 4, 6

$$\therefore P(\text{getting an even no.}) = \frac{3}{6} \Rightarrow \frac{1}{2} \quad 2$$

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SECTION – D

13. Sol. : Let Ram's present age = x years

3 years ago Ram's age = $(x - 3)$ years

5 years after Ram's age = $(x + 5)$ years

ATQ $\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$ 2

$\Rightarrow 3(x+5) + 3(x-3) = (x-3)(x+5)$

$\Rightarrow 3x + 15 + 3x - 9 = x^2 + 2x - 15$

$\Rightarrow x^2 - 4x - 21 = 0$ 2

$x^2 - 7x + 3x - 21 = 0$

$x(x-7) + 3(x-7) = 0$

$(x-7)(x+3) = 0$

or $x = 7, -3$

Thus Ram's present age is 7 years. 2

14. Sol. : Let AB be the building of height h .

And the height of tower is 50 m.

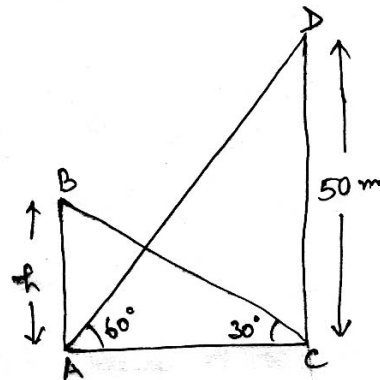
From Δ s BAC and DCA

$\frac{AC}{AB} = \cot 30^\circ$

$\Rightarrow \frac{AC}{h} = \sqrt{3}$

$\Rightarrow AC = h\sqrt{3}$ (i)

In Δ DCA



$$\frac{DC}{AC} = \tan 60^\circ \quad 2$$

$$\frac{50}{AC} = \sqrt{3} \Rightarrow AC = \frac{50}{\sqrt{3}} \dots\dots\dots (ii) \quad 2$$

from (i) & (ii)

$$\sqrt{3}h = \frac{50}{\sqrt{3}}$$

$$\Rightarrow h = \frac{50}{\sqrt{3}} \times \frac{1}{\sqrt{3}} = \frac{50}{3} \Rightarrow 16\frac{2}{3} \text{ m}$$

Hence the height of building is $16\frac{2}{3}$ m 2

OR

Sol. : L. H. S. $\frac{\sin \theta - 2 \sin^3 \theta}{2 \cos^3 \theta - \cos \theta}$

$$= \frac{\sin \theta (1 - 2 \sin^2 \theta)}{\cos \theta (2 \cos^2 \theta - 1)} \quad 1$$

$$= \tan \theta \frac{(1 - 2 \sin^2 \theta)}{[2 (1 - \sin^2 \theta) - 1]} \quad 1$$

$$= \tan \theta \left[\frac{(1 - 2 \sin^2 \theta)}{2 - 2 \sin^2 \theta - 1} \right] \quad 1$$

$$= \tan \theta \left[\frac{1 - 2 \sin^2 \theta}{1 - 2 \sin^2 \theta} \right]$$

$$= \tan \theta \quad 2$$

= R. H. S.

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15. Sol. : Let a be the first term and d be the common difference.

$$\therefore a = 17, d = 9$$

$$\text{and } a_n = 350$$

$$a + (n - 1) d = 350 \quad 2$$

$$17 + (n - 1) 9 = 350$$

$$(n - 1) = \frac{350 - 17}{9}$$

$$n = 37 + 1$$

$$\therefore n = 38 \quad 2$$

$$\text{Now } S_n = \frac{n}{2} [a + a_n]$$

$$\text{or } S_{38} = \frac{38}{2} [17 + 350]$$

$$= 19 \times 367$$

$$\text{or } S_{38} = 6973 \quad 2$$

16. Sol. : Let h be the required height of the platform

The volume of the platform will be equal to the volume of the earth dug out from the well. 1

$$\text{Now The valume of the earth} = \pi r^2 h$$

$$= \frac{22}{7} \times 3.5 \times 3.5 \times 20$$

$$= 770 \text{ m}^3 \quad 2$$

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Also the volume of platform = $l \times b \times h$
 $= 22 \times 14 \times h \text{ m}^3$ 1

But volume of platform = volume of the well

$$22 \times 14 \times h = 770$$

$$h = \frac{770}{22 \times 14}$$

$$h = 2.5 \text{ m}$$

\therefore Height of the platform = 2.5 m 2

17. Sol. :

Monthly Consumption	No. of Consumers (f)	c. f.
65-85	4	4
85-105	5	9
105-125	13	22
125-145	20	42
145-165	14	56
165-185	8	64
185-205	4	68

2

$$\frac{n}{2} = \frac{68}{2} \Rightarrow 34$$

Median Class = 125-145

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So $l = 125$, $c. f. = 22$, $f = 20$, $h = 20$ 2

$$\text{Median} = l + \frac{\frac{n}{2} - c.f.}{f} \times h$$

$$= 125 + \frac{34 - 22}{20} \times 20$$

\therefore Median = $125 + 12 \Rightarrow 137$ units 2

OR

Sol. : The maximum frequency is 61

\therefore The mode class = 60-80

$l = 60$, $f_0 = 52$, $f_1 = 61$, $f_2 = 38$, $h = 20$ 2

$$\text{Mode} = l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times h$$

$$= 60 + \frac{61 - 52}{2 \times 61 - 52 - 38} \times 20$$
 2

$$= 60 + \frac{9}{122 - 90} \times 20$$

$$= 60 + \frac{9}{32} \times 20$$

$$= 60 + 5.625$$

or Mode = 65.625 2



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