430/6/1

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Term II Compartment Examination, 2022
Marking Scheme – Mathematics (SUBJECT CODE 241)
(PAPER CODE 430/6/1)

General Instructions: -

1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2. **"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc may invite action under IPC."**
3. Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one's own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. **However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and marks be awarded to them. In class-X, while evaluating two competency based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, marks should be awarded.**
4. The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
5. Evaluators will mark(√) wherever answer is correct. For wrong answer 'X" be marked. Evaluators will not put right kind of mark while evaluating which gives an impression that answer is correct and no marks are awarded. **This is most common mistake which evaluators are committing.**
6. If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
7. If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
8. If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out.
9. No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
10. A full scale of marks 0-40 (0-40 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
11. Every examiner has to necessarily do evaluation work for full working hours i.e. 8 hours every day and evaluate 30 answer books per day in main subjects and 35 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.
12. Ensure that you do not make the following common types of errors committed by the Examiner in the past:-
    - Leaving answer or part thereof unassessed in an answer book.
    - Giving more marks for an answer than assigned to it.
    - Wrong totaling of marks awarded on a reply.
    - Wrong transfer of marks from the inside pages of the answer book to the title page.
    - Wrong question wise totaling on the title page.
    - Wrong totaling of marks of the two columns on the title page.
    - Wrong grand total.
    - Marks in words and figures not tallying.

- Wrong transfer of marks from the answer book to online award list.
- Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.)
- Half or a part of answer marked correct and the rest as wrong, but no marks awarded.

13. While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.

14. Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.

15. The Examiners should acquaint themselves with the guidelines given in the Guidelines for spot Evaluation before starting the actual evaluation.

16. Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.

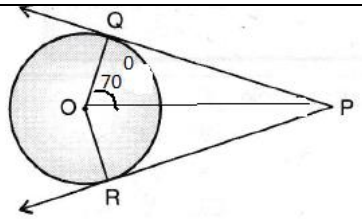
17. The Board permits candidates to obtain photocopy of the Answer Book on request in an RTI application and also separately as a part of the re-evaluation process on payment of the processing charges.

MARKING SCHEME

SECONDARY SCHOOL EXAMINATION: 2022

Subject: Mathematics (BASIC)
Subject Code: 241

Question Paper Code: 430/6/1
Date of Examination: 23.8.2022

Q. No.	Expected Answer/ Value points SECTION-A	Distribution of marks
1(a)	$6x^2 - 2x + \frac{1}{6} = 0$ $\Rightarrow 36x^2 - 12x + 1 = 0$ $\Rightarrow (6x - 1)(6x - 1) = 0$ $x = \frac{1}{6}$	 ½ 1 ½
	OR	
1(b)	$9x^2 + 8kx + 16 = 0$ $D = b^2 - 4ac = 64k^2 - 576$ For real and equal roots $D = 0 \Rightarrow 64k^2 - 576 = 0$ $\Rightarrow 64k^2 = 576 \Rightarrow k = \pm 3$	 ½ ½ 1
2	 $\angle OQP = 90^0$ (tangent $\perp$ radius) .: In Δ OQP $\angle$ OPQ = $180^0 - (70^0 + 90^0)$ $= 20^0$ $\angle$ OPQ = $\angle$ OPR = 20^0 .: $\angle$ QPR = $20^0 + 20^0 = 40^0$	 ½ ½ ½ ½
3(a)	$S_n = 180$ $\frac{n}{2}(5 + 40) = 180$ $\Rightarrow \frac{n}{2} \times 45 = 180$ $n = 8$	1 1
	OR	
3(b)	$a_7 = a_{11} - 24$ $a + 6d = a + 10d - 24$ $4d = 24 \Rightarrow d = 6$ $a_{20} = a + 19d = 12 + 19 \times 6$ $= 12 + 114 = 126$	 1 ½ ½

4

$a_n = \frac{n(n+1)(2n+1)}{6}$

n =1, $a_1 = \frac{1(2)(3)}{6} = 1$ ½

n =2, $a_2 = \frac{2(3)(5)}{6} = 5$ ½

n =3, $a_3 = \frac{3(4)(7)}{6} = 14$ ½

1, 5, 14

$a_3 - a_2 \neq a_2 - a_1$

.: given sequence is not an A.P ½

5

Marks	No. of students	Cumulative frequency
1-3	5	5
3-5	4	9
5-7	18	27
7-9	16	43
9-11	17	60

Lower limit of Modal class= 5 ½

Upper limit of Median class = 9 1

Required sum = 5 + 9 =14 ½

6

Marks	xi	f_i	$f_i x_i$
0-10	5	15	75
10-20	15	20	300
20-30	25	35	875
30-40	35	k	35k
40-50	45	10	450
Total		**80 + k**	**1700 + 35k**

Correct Table: 1

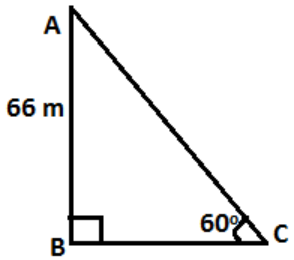
$M = \frac{\Sigma f_i x_i}{\Sigma f_i}$

Mean $\bar{x}$ = 24 = $\frac{1700+35k}{80+k}$ ½

$\Rightarrow k = 20$ ½

SECTION-B

7



1 mark for correct figure

In right ΔABC

$\sin 60^0 = \frac{AB}{AC}$ ½

$\frac{\sqrt{3}}{2} = \frac{66}{AC}$ 1

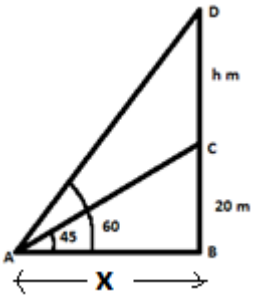
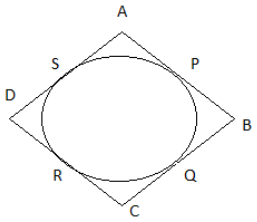
$\Rightarrow AC = 44\sqrt{3}$ ½

Length of the string = $44\sqrt{3}$ m

8

* Constructing a circle of radius 4 cm and marking a point at a distance of 6 cm from the centre of the circle. 1

* Constructing a pair of tangents correctly 2

9 (a)	A.T.Q. Volume of rod = Volume of wire $\Rightarrow \pi \times \frac{1}{2} \times \frac{1}{2} \times 8 = \pi R^2 \times 18$ $R^2 = \frac{1}{9} \Rightarrow R = \frac{1}{3}$.: Thickness of wire = $2R = \frac{2}{3}$ cm	1+1 ½ ½
	OR	
9(b)	Total volume = $\frac{4}{3}\pi[6^3 + 8^3 + 10^3]$ $= \frac{4}{3}\pi \times 1728$ $\Rightarrow \frac{4}{3}\pi \times 1728 = \frac{4}{3}\pi R^3$ (where R is the radius of the resulting sphere) $R^3 = 1728$ R = 12 cm	1 ½ 1 ½
10	Height of cone = 2cm Radius of cone = $\frac{4}{2}$ = 2cm Volume of the toy $= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 h$ $= \frac{2}{3} \times \frac{22}{7} \times 2 \times 2 \times 2 + \frac{1}{3} \times \frac{22}{7} \times 2 \times 2 \times 2$ $= \frac{176}{7}$ cm^3 or 25.16 cm^3 (approx.)	½ 1+1 ½
	SECTION-C	
11	 In right ΔABC, $\tan 45^0 = \frac{20}{x}$ $\Rightarrow x = 20$ In right ΔABD, $\tan 60^0 = \frac{h+20}{x}$ $20\sqrt{3} = h + 20$ $h = 20(\sqrt{3} - 1)$ m **or** $h = 14.64$ m	1 Mark for correct figure 1 1 1
12(a)	 As the tangents drawn from an external point to the circle are equal in length .: AP = AS ——————(i) BP = BQ ——————(ii) CR = CQ ——————(iii) DR = DS ——————(iv) Adding (i), (ii), (iii) & (iv) (AP + BP) + (CR + DR) = (AS + DS) + (BQ + CQ) AB + CD = AD + BC	½ mark for figure 2 ½

12(b)

But AB = CD and AD = BC (opposite sides of IIgm)
.: 2AB = 2BC
$\Rightarrow AB = BC$ — 1
.: ABCD is a rhombus

OR

As the tangents drawn from an external point to the circle are equal in length
AP = AS.....(i)
BP = BQ.....(i)
CR = CQ.....(ii)
DR = DS.....(iv) — 2
Adding (i), (ii), (iii) & (iv)
(AP + BP) + (CR + DR) = (AS + DS) + (BQ + CQ) — 1
AB + CD = AD + BC — 1

13

Age	x_i	f_i	cf	$f_i x_i$
0-10	5	3	3	15
10-20	15	7	10	105
20-30	25	12	22	300
30-40	35	18	40	630
40-50	45	14	54	630
50 - 60	55	17	71	935
				2615

(a) Median class = 30 – 40 — ½

$$Median = l + \frac{\frac{N}{2} - C}{f} \times h$$

$= 30 + (\frac{35.5-22}{18}) \times 10$ — 1

Median age = 37.5 years — ½

b) $\sum f_i x_i = 2615, \sum f_i = 71$ — ½ +½

Mean Age $= \frac{\sum f_i x_i}{\sum f_i} = \frac{2615}{71}$ — ½

≈36.83 years — ½

14

a) Perimeter (As per fencing condition in the question)= x + 2y — 1

Note: Since the question is ambiguous, P = 2x+2y may also be awarded 1 mark in part (a) only

Area = xy — 1

b) x = 110 – 2y
$2y^2 - 110y + 1500 = 0$ — ½
$y^2 - 55y + 750 = 0$
(y – 25)(y – 30) = 0 — ½
y = 25, y = 30
y = 25 $\Rightarrow$ x = 60 — ½
y = 30 $\Rightarrow$ x = 50 — ½