THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

AIM HIGH, TOGETHER WE FLY

Model Examination

Grade: X	**Mathematics**	**Max. Marks:80**
Date: 01-12-2023		**Duration: 3Hrs**

General Instructions:

❖ This Question paper contains - **five sections** A, B, C, D, and E. Each section is compulsory. However, there are internal choices in some questions.
❖ **Section A** has 18 **MCQs and 02** Assertion-Reason-based questions of 1 mark each.
❖ **Section B** has 5 **Very Short Answer (VSA)-type** questions of 2 marks each.
❖ **Section C** has 6 **Short Answer (SA)** questions of 3 marks each.
❖ **Section D** has 4 **Long Answer (LA)-type** questions of 5 marks each.
❖ **Section E** has 3 **source-based/case-based/passage-based/integrated units of assessment** (4 marks each) with sub-parts.

	SECTION-A **(Multiple Choice Questions, each question carries 1 mark)**	
1.	If the distance between the points (2, −2) and (−1, x) is 5, one of the values of x is (a) −2 (b) 2 (c) −1 (d) 1	1
2.	If two positive integers a and b are written as $a = x^3y^2$ and $b = xy^3$, where x, y are prime numbers, then LCM (a, b) is (a) xy (b) xy^2 (c) x^3y^3 (d)x^2y^2	1
3.	The probability of getting a spade or an ace from a well-shuffled pack of 52 playing cards is (a) 17/52 (b) 16/52 (c) 15/52 (d) 13/52	1
4.	The quadratic polynomial, the sum and product of whose zeroes are − 3 and 2, respectively. (a) x^2+3x+2 (b) $x^2- 3x +2$ (c) x^2+3x-2 (d) x^2-3x-2	1
5.	p and q are natural numbers and p is the multiple of q, then what is the HCF of p & q (a) pq (b) p (c) q (d) p + q	1
6.	Find the discriminant of the quadratic equation $2x^2 − 4x +3= 0$ (a) (-8) (b) 8 (c) (-9) (d) 9	1

7.	What is the length of the arc of the sector of the circle with radius 14cm and central angle 90^0 (a) 22cm (b)44cm (c) 88 cm (d) 11 cm	1
8.	D and E are the midpoints of side AB and AC of a triangle ABC, respectively, and BC = 6 cm. If DE || BC, then the length (in cm) of DE is (a) 2.5cm (b)3cm (c)5cm (d) 6cm	1
9.	If sin (A-B)=1/2 and cos(A+B)= ½ , Find A & B. (a) A=45^0, B=15^0 (b)A=15^0, B=45^0 (c)A=45^0, B=45^0 (d) A=15^0, B=15^0	1
10	If P(E)=0.05, What is the probability of "not E" (a) 0.095 (b) 9.5 (c)95 (d) 0.95	1
11	Which term of the A.P 4, 9, 14,19,……is 124. (a) 24 (b) 25 (c) 26 (d)27	1
12	If 2 , $x + 10$, $3x + 2$ are in AP ,find x. (a) 4 (b) 5 (c) 6 (d) 7	1
13	Find a point on the x-axis, which is equidistant from $A(2, - 5)$, $B(- 2, 9)$. (a)$(- 7, 0)$ (b) (7,0) (c)(6,0) (d)(3,8)	1
14	If $sin\ B$ = 1/2 , then find 3cosB − 4cos³B. (a)1 (b) 2 (c) 3 (d) 0	1
15	Which of the following can be the probability of an event. (a)1.003 (b) -0.09 (c) 17/23 (d) 7/6	1
16	Two players Derin and Elena play a tennis match. The probability of Elena winning the match is 0.64.Then the the probability of Derin winning the match is a)0.36 (b) 0.06 (c) 0 (d) 3.6	1
17	The value of (sin30° + cos30°) − (sin60° + cos60°) is (a) − 1 (b) 0 (c) 1 (d) 2	1
18.	If cos A = 4/5 , then the value of tan A is (a) 3/5 (b) 3/4 (c) 4/3 (d) 5/3	1

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

   i)   Both A and R are true and R is the correct explanation of A.
   ii)   Both A and R are true but R is not the correct explanation of A.
   iii)   A is true but R is false.
   iv)   A is false but R is true.

19	**Assertion (A):** The polynomial $(x) = x^2 + 3x + 3$ has two real zeroes. **Reason (R):** A quadratic polynomial can have at most two real zeroes.	1

20	**Assertion(A):** HCF(306,657) = 9, LCM(306,657) = 22339 **Reason (R):** 6^n can end with the digit Zero for any natural number n.	1

SECTION-B
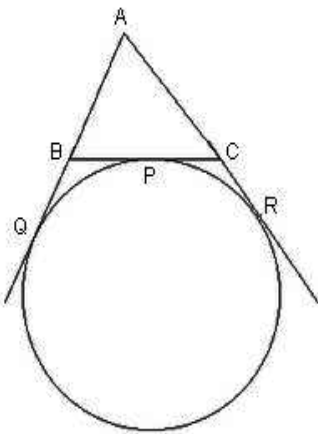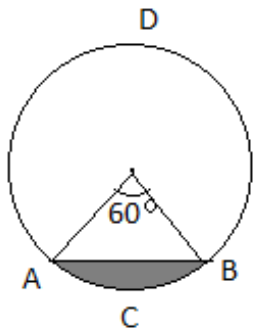
**(All questions are compulsory. In case of internal choice, attempt any one question)**

21.	Prove that $2 + \sqrt{3}$ is an irrational number. given that $\sqrt{3}$ is an irrational number.	2
22.	Find the angle of elevation of the sun when the shadow of a pole h metres high is $\sqrt{3}$ h metres long. **OR** An observer 1.5 metres tall is 20.5 metres away from a tower 22 metres high. Determine the angle of elevation of the top of the tower from the eye of the observer.	2

23.	3 coins are tossed together. What is the probability of gettTailing
	   a) Exactly two heads.
	   b) At least two heads.
	   c) At most two heads.
	   d) Exactly one tail
	OR
	A die is thrown twice. What is the probability that
	   a) 5 will not come up either time?
	   b) 5 will come at least once?
	   c) both the numbers same
	   d) both the numbers are different
		2

24.	A cubical ice cream brick of edge 22 cm is to be distributed among some children by filling ice cream cones of radius 2 cm and height 7 cm up to its brim. How many children will get the ice cream cones?	2
25.	A circle is touching the side BC of ΔABC at P and touching AB and AC produced at Q and R. Prove that $AQ = \frac{1}{2}(Perimetre\ of\ \Delta ABC)$ 	2

SECTION-C
(All questions are compulsory. In case of internal choice,attempt any one question)

26.	Three bells ring at intervals 6 , 12 ,18 minutes. If all the three bells rang together at 6 am, when will they ring together again?	3
27	i)Prove that , $(sin\ A +\ cosec\ A)^2 + (cos\ A +\ sec\ A)^2 = 7+ tan^2\ A + cot^2\ A$ **OR** ii) Prove that $\sqrt{\frac{1+sin\theta}{1-sin\theta}} = sec\ \theta - tan\theta$	3
28.	A chord of a circle of radius 15 cm subtends an angle of 60^0 at the centre. Find the areas of the corresponding minor and major segments of the circle .(π = 3.14, $\sqrt{3}$=1.73) 	3

	OR A car has two vipers that do not overlap. Each viper has a blade of length 25 cm sweeping through an angle of 120 degrees. Find the total area cleaned at each sweep of the blades..	
29.	If Q (0,1) is equidistant from P(5, -3) and R(x, 6). Find the values of x . Also, find the distances QR and PR.	3
30.	A train travels a distance of 480 km at a uniform speed. if the speed had been 8km/hr less, then it would have taken 3 hours more to cover the same distance. Calculate the speed of the train.	3
31.	Prove that the tangent is perpendicular to the radius through the point of contact. **OR** Prove that the lengths of the tangents drawn from an external point a circle are equal.	3
	SECTION-D **(All questions are compulsory. In case of internal choice, attempt any one Question)**	
32.	Ramkali required ₹2500 after 12 weeks to send her daughter to school. She saved 100 in the first week and increased her weekly saving by ₹20 every week. Find out whether she will be able to send her daughter to school after 12 weeks. **OR** The sum of the first three terms of an AP is 33. If the product of the first and the third term exceeds the second term by 29, find the AP.	5
33	State and prove the basic proportionality theorem.	5
34.	From the top of a 7 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower. **OR** A T.V tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60^0. From another point 20m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower Is 30^0. Find the height of the tower and the width of the canal.	5

D 30° C 60° B
20 m
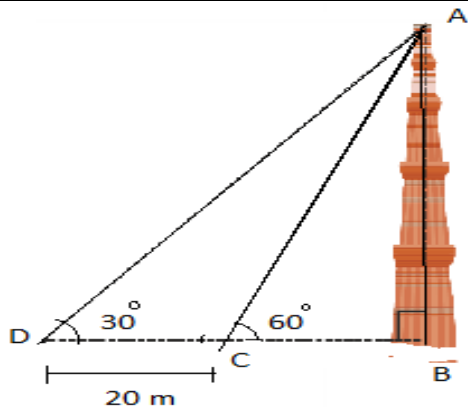
35. If the median of the following frequency distribution given below is 28.5.
Find the values of x and y

| Class interval	0–10	10–20	20–30	30–40	40–50	50–60	Total
Frequency	5	x	20	15	y	5	60

OR

The distribution given below shows the number of wickets taken by bowlers in one-day cricket matches. Find the mean and mode of the number of wickets taken.

Number of wickets	20 – 60	60 – 100	100 – 140	140 – 180	180 – 220	220 – 260
Number of bowlers	7	5	16	12	2	3

SECTION E

Read the following and answer any four questions from (i) to (v).

A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 meters) in height.
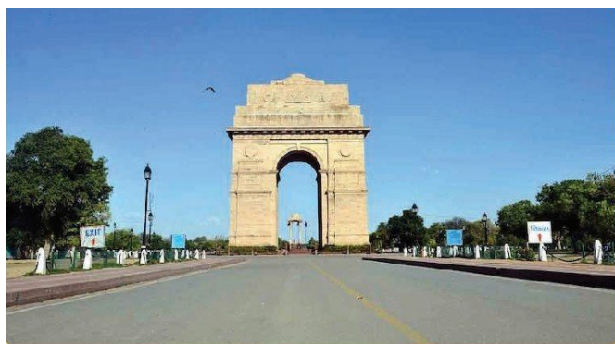
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(i) What is the angle of elevation if they are standing at a distance of 42 m away from the monument?

(a) 30° (b) 45° (c) 60° (d) 0°

(ii) They want to see the tower at an angle of 60°. So, they want to know the distance where they should stand and hence the distance is

(a) 24.24 m (b) 20.12 m (c) 42 m (d) 24.64 m

(iii) If the altitude of the Sun is at 60° then the height of the vertical tower that will cast a shadow of length 20 m, i

(a) $20\sqrt{3}$ m (b) $\frac{20}{\sqrt{3}}$ m (c) $\frac{15}{\sqrt{3}}$ m (d) $15\sqrt{3}$ m

(iv) The ratio of the length of a rod and its shadow is 1:1. The angle of elevation of the Sun is

(a) 30° (b) 45° (c) 60° (d) 90°

(v) The angle formed by the line of sight with the horizontal when the object view is below the horizontal level is

(a) corresponding angle (b) angle of elevation

(c) angle of depression   (d) complete angle

37.	In a coffee shop ,coffee is served in two types of cups.One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21cm	

Based on the above ,answer the following questions
1) Find the area of the base of the cylindrical cup .
2) What is the curved surface area of the cylindrical cup.
3) What is the capacity of cylindrical cup?
4) What is the capacity of Hemispherical cup?

1
1
1
1

38.	A stadium was to be constructed to accommodate at least 1500 people.The chairs are to be placed in concentric circular arrangements in such a way that each succeeding circular row has 10 seats more than the previous one.	
	1) If the first circular row has 30 seats, how many seats will be there in the 10th row ?	2
	2) For 1500 seats in the stadium,how many rows need to Be there?	2