APEEJAY SCHOOL,FARIDABAD
TERM-1 EXAMINATION,2023-24
CLASS-X
SUBJECT-MATHEMATICS

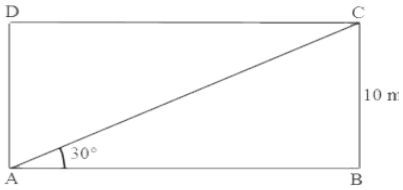
Time Allowed- 3Hrs. Max.Marks-80

General Instructions:

- **All** questions are compulsory.
- This question paper contains **38** questions divided into five Sections A, B, C, D and E.
- **Section A** has 20 MCQs carrying 1 mark each.
- **Section B** has 5 questions carrying 02 marks each.
- **Section C** has 6 questions carrying 03 marks each.
- **Section D** has 4 questions carrying 05 marks each.
- **Section E** has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.

SECTION – A

Q1.	If one root of equation $4x^2-2x+k-4=0$ is reciprocal of the other. The value of k is: (a) -8 (b) 8 (c) -4 (d) 4	1
Q2.	If $\sin 2A = \frac{1}{2}\tan^2 45°$ where A is an acute angle, then the value of A is (a) 60° (b) 45° (c) 30° (d) 15°	1
Q3.	Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots. (a) 2 (b) 3 (c) 4 (d) 5	1
Q4.	ΔABC is such that AB = 3 cm, BC = 2 cm and CA = 2.5 cm. If $\Delta DEF \sim \Delta ABC$ and FE = 4 cm, then find the perimeter of ΔDEF. (a) 12 cm (b) 13 cm (c) 14 cm (d) 15 cm	1
Q5.	The 11th and 13th terms of an AP are 35 and 41 respectively, its common difference is (a) 38 (b) 32 (c) 6 (d) 3	1
Q6.	The LCM of smallest two-digit composite number and smallest composite number is (a) 12 (b) 14 (c) 20 (d) 44	1
Q7.	The probability of getting a bad egg in a lot of 400 is 0.035. The number of bad eggs in the lot is (a) 7 (b) 14 (c) 21 (d) 28	1
Q8.	The least number that is divisible by all the numbers from 1 to 5 is: (a) 70 (b) 60 (c) 80 (d) 90	1
Q9.	The value of k for which the lines represented by the following pair of linear equations are coincident is $2x + 3y + 7 = 0$ and $8x + 12y + k = 0$ (a) all real values except 14 (b) 8 (c) 28 (d) 14	1
Q10.	The value of $\frac{\cot 60^0}{\tan 30^0}$ is (a) $\sin 45^0$ (b) $\tan 45^0$ (c) $\sec 45^0$ (d) $\cos 30^0$	1
Q11.	The solution of the equations x - y = 2 and x + y = 4 is: (a) 3 and 1 (b) no solution (c) 3 and -1 (d) Infinitely many	1
Q12.	If a tower 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the sun's elevation is: (a) 60° (b) 45° (c) 30° (d) 90°	1

Q13.	If 1 is a zero of polynomial $ax^2-3(a-1)x-1$, then the value of a is- (a)1 (b) 2 (c) -1 (d) -2	1
Q14.	In the given figure, BC=10m and $\angle CAB=30^0$ then the perimeter of rectangle ABCD is-  (a) $20(\sqrt{3}+1)$m (b) $40\sqrt{3}$m (c) $10(\sqrt{3}+1)$m (d) $20\sqrt{3}$	1
Q15.	If the number x-2, 4x-1 and 5x+2 are in A.P., then the value of x is (a)1 (b) 2 (c) 3 (d) 4	1
Q16.	A 15 m high tower casts a shadow 24 m long at a certain time and at the same time, a telephone pole casts a shadow 16 m long. Find the height of the telephone pole. (a) 12 m (b) 10 m (c) 9 m (d) 11 m	1
Q17.	Two dice are thrown at the same time and the product of numbers appearing on them is noted. The probability that the product is a prime number is (a) 1/3 (b) 1/6 (c) 1/5 (d) 5/6	1
Q18.	If α and β are the zeroes of the polynomial $f(x)=4x^2+3x+7$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is (a) 7/3 (b) -7/3 (c) 3/7 (d) -3/7	1
	DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option. (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A). (c) Assertion (A) is true but Reason (R) is false. (d)Assertion (A) is false but Reason (R) is true.	1
Q19.	**Assertion(A):** The HCF of two numbers is 18 and their product is 3072. Then theirLCM = 169. **Reason(R) :** If *a*, *b* are two positive integers, then HCF x LCM = *a* x *b*.	
Q20.	**Assertion(A):** The ratio of the length of a rod and its shadow is 1: $\sqrt{3}$. The angle of elevationof the sun is 45^0. **Reason(R)** : The angle formed by the line of sight with the horizontal when the objectviewed is below the horizontal level is angle of depression.	1

SECTION – B

Q21.	If sec (A + B) = 2 and tan (A – B) = $1/\sqrt{3}$; $0° < A+B \leq 90°$; A > B, find A and B.	2
Q22.	Given the linear equation $2x+3y-8=0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is intersecting lines. Also, find the solution(if exists) of the pair of equations by elimination method.	2
Q23.	If α & β are the zeroes of quadratic polynomial $p(x)=x^2-(k+6)x+2(2k-1)$, find the value of k so that $\alpha+\beta=\frac{1}{2}\alpha\beta$.	2
Q24.	Given that $\sqrt{5}$ is irrational, prove that $3+2\sqrt{5}$ is irrational.	2

Q25.	A fraction becomes 1/3 when 1 is subtracted from the numerator and it becomes 1/4 when 8 is added to its denominator. Find the fraction.	2

SECTION – C

Q26.	The sum of the 5th and the 9th terms of an AP is 30. If its 25th term is three times its 8th term, find the AP.	3
Q27.	Find the greatest five digit number which is exactly divisible by 12,18,and 24.	3
Q28.	Find the zeros of the quadratic polynomial $6x^2$-3-7x, and verify the relation between the zeros and its coefficients.	3
Q29.	E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.	3
Q30.	Cards numbered 1 to 90 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is (i)not divisible by 3 (ii) a prime number greater than 7 (iii) not a perfect square number.	3
Q31.	The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.	3

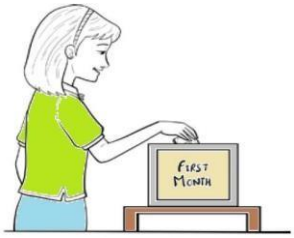
SECTION – D

Q32.	(i) If a line drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. (ii) In the ΔABC, DE ‖ BC and AD = 3x − 2, AE = 5x − 4, BD = 7x − 5, CE = 5x − 3, then find the value of x	5
Q33.	The lower window of a house is at a height of 2 m above the ground and its upper window is 4 m vertically above the lower window. At certain instant, the angles of elevation of a balloon from these windows are observed to be 60° and 30°, respectively. Find the height of the balloon above the ground.	5
Q34.	A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.	5
Q35.	(i)If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$. (ii)Prove that: $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta \operatorname{cosec}\theta$	5

SECTION – E

CASE STUDY

Q36.	Book fairs encourage reading habits among people of all age groups. Rubina and her friend Rubik visited a book fair. Rubina is fond of maths books and Rubik likes science books. The Number of science books bought by Rubik is half the number of maths books that Rubina bought. Rubik calculated that the average cost of science books he bought is equal to Rs.80 and Rubina calculated the average cost of maths books that she bought is equal to Rs.60. The total amount they both paid together for their purchase was Rs.400.Study the situation and answer the question given below assuming y as number of science books bought and x as the number of maths books bought.	4

	 (i) What is the algebraic representation of the relation between the number of science books and maths books? (ii) Write an equation that correctly represents the relation between the number of books and the total cost using the average cost of each type of book? (iii) How many books each are bought by Rubik and Rubina?	
Q37.	Ankita saves Rs. 24 during the first month Rs. 30 in the second month and Rs. 36 in the third month. She continues to save in this manner.  On the basis of above information, answer the following questions. (i) Whether the monthly savings of Ankita form an AP or not? If yes, then write the first term and common difference. (ii) What is the amount that she will save in 15th month? (iii) In which month, will she save Rs. 66 ?	4
Q38.	A labourer prints 400 T-shirts in a day. The supervisor checked the T-Shirts and found that 312 prints were good, 54 prints were minor defects and rest of the prints were of major defects. Himani a customer will buy a T-shirt only if it is good but a trader will buy if it has no major defect.  (i) What is the number of T-shirts that were major defected? (ii) Find the probability that the T-shirt is not good. (iii) Find the probability that neither Himani nor the trader buys the T-Shirts.	4