INDIAN SCHOOL AL WADI AL KABIR

Sample Question Paper

First Rehearsal Examination (2022-23)

Sub: MATHEMATICS STANDARD (041)

Date: 07-11-2022 Time Allowed: 3 hours

Class: X Maximum marks: 80

General Instructions

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. 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.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided.

   An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated

SECTION A

Section A consists of 20 questions of 1 mark each.

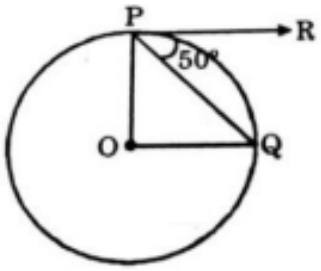
Q.1. If the HCF of 65 and 117 is expressible in the form 65m - 117, then the value of m is

A	4	**B**	2	**C**	1	**D**	3

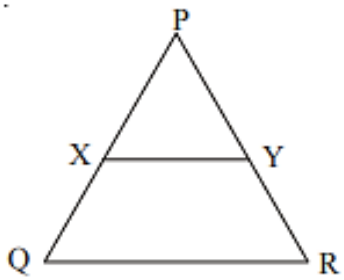
Q.2. If the sum of the zeroes of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to their product, then k equals

A	$\frac{1}{3}$	**B**	$-\frac{1}{3}$	**C**	$\frac{2}{3}$	**D**	$-\frac{2}{3}$

Q.3.*	The 4th term from the end of an AP -11, -8, -5, ... 49 is						
	A	37	**B**	40	**C**	43	**D**	58
Q.4.	For which value (s) of p, will the lines represented by the following pair of linear equations be parallel. $3x - y - 5 = 0$; $6x - 2y - p = 0$						
	A	all real values except 10	**B**	10	**C**	$\frac{5}{2}$	**D**	$\frac{1}{2}$
Q.5.	The LCM of smallest two -digit composite number and smallest composite number is						
	A	12	**B**	4	**C**	20	**D**	44
Q.6.	A die is thrown once. The probability of getting a number which is not a factor of 36 is						
	A	$\frac{1}{6}$	**B**	$\frac{1}{3}$	**C**	$\frac{1}{5}$	**D**	$\frac{5}{6}$
Q.7.	The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has						
	A	two distinct real roots	**B**	two equal real roots	**C**	no real roots	**D**	more than two real roots
Q.8.	The coordinates of the point which divides the line segment joining the points (4, -3) and (8,5) in the ratio 3:1 internally.						
	A	(-3, -7)	**B**	(-7, -3)	**C**	(3, 7)	**D**	(7, 3)
Q.9.	D and E are respectively the points on the sides AB and AC of a triangle ABC such that AD = 2 cm, BD = 3 cm, BC = 7.5 cm and DE ‖ BC. Then, length of DE (in cm) is						
	A	2.5	**B**	3	**C**	5	**D**	6
Q.10.	If $\sin\theta = \frac{a}{b}$, then $\tan\theta$ is equal to						
	A	$\frac{b}{\sqrt{a^2+b^2}}$	**B**	$\frac{b}{\sqrt{b^2-a^2}}$	**C**	$\frac{a}{\sqrt{a^2-b^2}}$	**D**	$\frac{a}{\sqrt{b^2-a^2}}$

Q.11.	The angle of elevation of the sun, when the shadow of a pole h meters high is $\sqrt{3}$ h is							
	A	30°	**B**	45°	**C**	60°	**D**	90°
Q.12.	In triangles PQR and MST, ∠P =55°, ∠Q =25°, ∠M =100° and ∠S =25°, then							
	A	Δ TSM ~ ΔPQR	**B**	Δ TSM ~ ΔQPR	**C**	Δ MST ~ ΔQRP	**D**	Δ TMS ~ ΔRQP
Q.13.	In the figure, O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, then the measure of ∠ POQ is 							
	A	80°	**B**	100°	**C**	90°	**D**	75°
Q.14.	In a survey it is found that every fifth person possess a vehicle, what is the probability of a person not possessing the vehicle?							
	A	0	**B**	$\frac{1}{5}$	**C**	$\frac{4}{5}$	**D**	1
Q.15.	If 3x = sec θ and $\frac{3}{x}$ = tan θ, then (x^2 - $\frac{1}{x^2}$) is equal to							
	A	3	**B**	1	**C**	$\frac{1}{9}$	**D**	9
Q.16.	Evaluate: $\frac{2 \tan 45° \times \cos 60°}{\sin 30°}$							
	A	$2\sqrt{2}$	**B**	2	**C**	1	**D**	$\frac{1}{2}$

Q.17. In the given figure, XY ∥ QR and $\frac{PX}{XQ} = \frac{PY}{YR} = \frac{1}{2}$, then



A	XY = QR	**B**	XY = $\frac{1}{3}$ QR	**C**	XY = $\frac{2}{3}$ QR	**D**	XY = $\frac{1}{2}$ QR

Q.18. Find the upper limit of the median class for the given frequency distribution:

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
Frequency	8	10	19	25	8

A	5	**B**	10	**C**	15	**D**	20

Q.19. **DIRECTION:** In question numbers 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R).**

Choose the correct option

Statement A (Assertion): PA and PB are two tangents to a circle with centre O such that ∠AOB = 110°, then ∠APB = 90°.

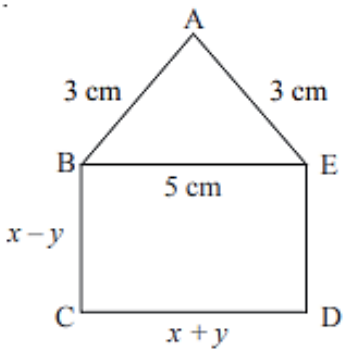
Statement R (Reason): The length of two tangents drawn from an external point are equal.

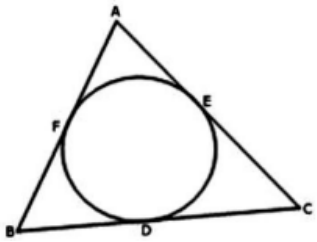
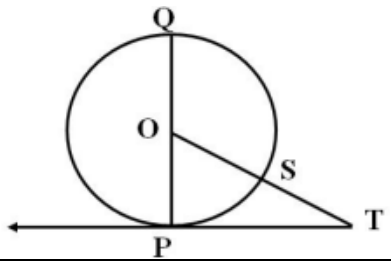
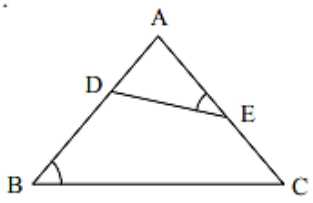
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A)

(b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A)

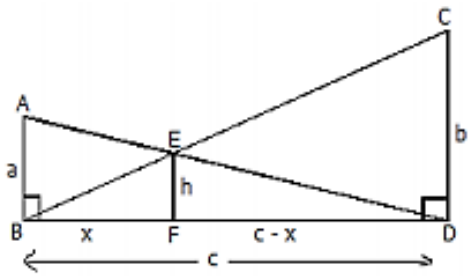
(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true.

Q.20.*	***Statement A (Assertion):*** If the height of a cone is 24 cm and diameter of the base is 14 cm, then the slant height of the cone is 25 cm. ***Statement R (Reason):*** If r be the radius and h be the slant height of the cone, then slant height is $\sqrt{h^2 + r^2}$ (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 and 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.
SECTION B	
Section B consists of 5 questions of 2 marks each.	
Q.21.	Solve: 99x + 101y = 499; 101x + 99y = 501 **OR** ABCDE is a pentagon with BE ‖ CD and BC ‖ DE, BC is perpendicular to CD If the perimeter of ABCDE is 21 cm, find x and y. 
Q.22.	Using empirical relationship, find the value of mode if the mean and median of the distribution are 14 and 15 respectively.

Q.23.	If the sides AB, BC and CA of Δ ABC touch a circle at F, D and E respectively, then prove that AF + BD + CE = $\frac{1}{2}$ (AB + BC + CA)  **OR** TP is a tangent to the circle with centre O. If ∠ TOQ = 120°, find the diameter of the circle when OT = 10 cm. 
Q.24	A box contains 12 balls of which some are red in colour. If 6 more red balls are put in the box and a ball is drawn at random, the probability of drawing a red ball double than what it was before. Find the number of red balls in the bag.
Q.25.	In the given fig, D and E are points on sides AB and CA of ΔABC such that ΔB = ∠AED. Show that ΔABC ~ ΔAED. 
SECTION C	
Section C consists of 6 questions of 3 marks each.	
Q.26.	The length, breadth and height of a room are 8 m 50 cm, 6 m 25 cm and 4 m 75 cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.

Q.27.	From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are 30° and 45° respectively. If the bridge is at a height of 3 m from the banks, then find the width of the river. **OR** The angles of depression of the top and bottom of a building 50 metres high as observed from the top of a tower are 30° and 60°, respectively. Find the height of the tower and also the horizontal distance between the building and the tower.
Q.28.	If α and β are the zeroes of the quadratic polynomial $4x^2$ + 4x + 1, then form a quadratic polynomial whose zeroes are 2α and 2β.
Q.29. *	Find the number of multiples of 9 lying between 300 and 700.
Q.30.	Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.
Q.31	Solve the following pair of linear equations graphically: x - y = 1, 2x + y = 8. Also find the co-ordinates of the points where the lines represented by the above equation intersect y – axis. **OR** A railway half ticket cost half the full fare but the reservation charges are the same on a half ticket as on a full ticket. One reserved first-class ticket costs ₹ 2530. One reserved first-class ticket and one reserved first-class half ticket from stations A to B costs ₹ 3810. Find the full first-class fare from stations A to B and also the reservation charges for a ticket
SECTION D	
Section D consists of 4 questions of 5 marks each.	
Q.32.	In a rectangular field of dimension 50 m x 40 m, a rectangular pond is constructed so that the area of grass strip of uniform breadth surrounding the pond would be 1184 m^2 . Find the length and breadth of the pond. * **OR**

	Solve for x: $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$; where a + b + x ≠ 0 and a, b, x ≠ 0
Q.33.	Two poles of height a and b (b > a) are c metres apart. Prove that the height h (in metres) of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is $\frac{ab}{a+b}$. 
Q.34.	Prove that $\frac{tan\theta}{1-\tan\theta} - \frac{cot\theta}{1-\cot\theta} = \frac{cos\theta+\sin\theta}{cos\theta+\sin\theta}$
Q.35. *	A circus tent is in the shape of a cylinder surmounted by a conical top of same diameter. If their common diameter is 56 m, the height of cylindrical part is 6 m and the total height of the tent above the ground is 27 m, find the area of canvas used to make the tent. (Use $\pi = \frac{22}{7}$) **OR** A solid wooden toy is in the form of a hemi-sphere surmounted by a cone of same radius. The radius of hemi-sphere is 3.5cm and the total wood used in the making of toy is $166\frac{5}{6} cm^3$. Find the height of the toy. Also, find the cost of painting the hemi-spherical part of the toy at the rate of ₹10 per cm^2

SECTION E

Case study- based questions are compulsory.

Q.36.

Case study-based 1

Archery is the sport, or skill of using a bow to shoot arrows. Figure depicts an archery target marked with its five scoring regions from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is 21 cm and each of the other bands is 10.5 cm wide.

Use the above information and figure to answer the questions that follow:

(i) What is the radius of the region representing gold and red scoring region? (1m)

(ii) What is the diameter of the region representing gold, red and blue scoring region? (1m)

(iii) What is the diameter of the archery target? (2m)

OR

What is the area of the region representing red scoring area?

Q.37.

Case study-based 2

In a cinema hall, people are seated at a distance of 1m from each other, to maintain the social distance due to CORONA pandemic. let three people sit at points P, Q and R whose coordinates are (6, -2) (9,4) and (10,6) respectively.

Based on the above information answer the following:

(i) What is the distance between P and R? (1m)

(ii) What is the midpoint of the line segment joining P and R? (1m)

(iii) What is the ratio in which Q divides the line segment joining P and R? (2m)

OR

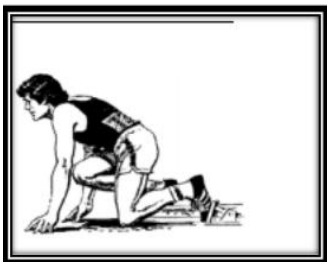
If a point S, lying on the straight-line joining Q and R divides the distance between them in the ratio of 1:2 then find the coordinates of S.

Q.38.

Case study-based 3 100m RACE

A stopwatch was used to find the time that it took a group of students to run 100 m**.**

Time (in sec)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of students	8	10	13	6	3



(i) What is the upper limit of the modal class? (1m)

(ii) What is the sum of lower limits of median class and modal class? (1m)

(iii) Estimate the mean time taken by a student to finish the race.

OR (2m)

Find the mode of the above data.

Answers(*indicates topics not included in the First Rehearsal Exam)							
Q.1	B	Q.2	D	Q.3	B	Q.4	A
Q.5	C	Q.6	A	Q.7	C	Q.8	D
Q.9	B	Q.10	D	Q.11	A	Q.12	A
Q.13	B	Q.14	C	Q.15	C	Q.16	B
Q.17	B	Q.18	C	Q.19	d	Q.20	a
Q.21	x = 3, y = 2 x = 5, y = 0	Q.22	17	Q.23	10 cm.	Q.24	3
Q.26	25 cm	Q.27	$3(\sqrt{3}+1)$ m	Q.28	$x^2 + 2x + 1$	Q.29	44
Q.31	(1, 4) ₹2500, ₹30	Q.32	34m,24m x = -a, -b	Q.35	$4136m^2$ 6cm, ₹ 770	Q.36	(i) 21 cm (ii) 63cm (iii) 105 cm, $1039.5cm^2$
Q.37	(i) $4\sqrt{5}$ units (ii) (8, 2) (iii) 3: 1, $(\frac{28}{3}, \frac{14}{3})$			Q.38	(i) 60 (ii) 80 (iii) 43, 46		