KENDRIYA VIDYALAYA, ERNAKULAM REGION

PRE-BOARD PRACTICE TEST II (2026-27)

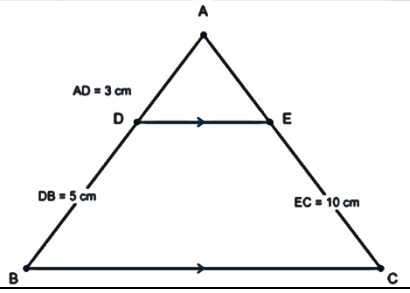
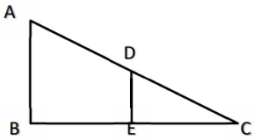
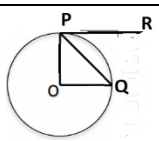
CLASS: X SUBJECT: MATHEMATICS (BASIC - 241)

Time Allowed: 3 Hours **Maximum Marks: 80**

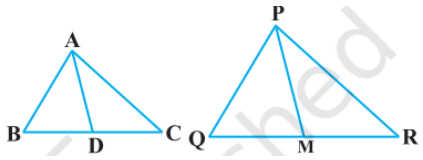
GENERAL INSTRUCTIONS:

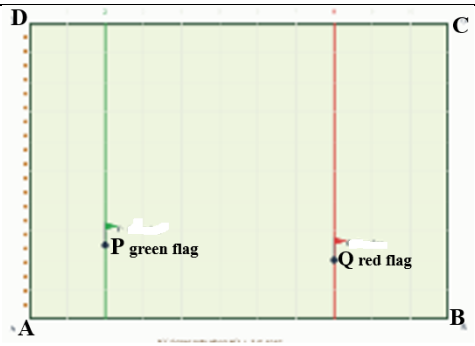
1. This question paper contains 38 questions divided into 5 Sections A, B, C, D and E.
2. Section A comprises 20 Multiple Choice Questions (MCQs) of 1 mark each (Q1 to Q20). Q19 and Q20 are Assertion-Reason questions.
3. Section B comprises 5 Short Answer Type-I (SA-I) questions of 2 marks each (Q21 to Q25).
4. Section C comprises 6 Short Answer Type-II (SA-II) questions of 3 marks each (Q26 to Q31).
5. Section D comprises 4 Long Answer (LA) questions of 5 marks each (Q32 to Q35).
6. Section E comprises 3 Case-Based integrated units of assessment (4 marks each) with sub-parts of 1, 1 and 2 marks respectively (Q36 to Q38).
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 2-mark sub-part of Section E questions.
8. Use of calculators is not permitted. Take $\pi = 22/7$ wherever required if not stated otherwise.

	--- SECTION A ---	
1	The HCF of 96 and 404 is: (a) 2 (b) 4 (c) 12 (d) 96	
2	If one zero of the quadratic polynomial $f(x) = x^2 + 3x + k$ is 2, then the value of k is: (a) 10 (b) -10 (c) -7 (d) -2	
3	The roots of the quadratic equation $x^2 - 0.04 = 0$ are: (a) ± 0.2 (b) ± 0.02 (c) 0.4 (d) 2	
4	The 11th term of the A.P. $-3, -1/2, 2, \ldots$ is: (a) 28 (b) 22 (c) -38 (d) 46½	
5	The distance of the point P(-6, 8) from the origin is: (a) 8 units (b) $2\sqrt{7}$ units (c) 10 units (d) 6 units	
6	The mid-point of the line segment joining the points A(-2, 8) and B(-6, -4) is: (a) (-4, 2) (b) (2, -4) (c) (-4, -2) (d) (4, 2)	

7	If the distance between the points (4, p) and (1, 0) is 5 units, then the value of p is: (a) ± 4 (b) 4 only (c) −4 only (d) 2	
8	In △ABC, DE || BC such that AD = 3 cm, DB = 5 cm and EC = 10 cm. The length of AE is: (a) 6 cm (b) 8 cm (c) 5 cm (d) 4.5 cm 	
9	If △ABC ~ △DEF such that 2 AB = DE and BC = 8 cm, then the length of EF is equal to: (a) 12 cm (b) 16 cm (c) 8 cm (d) 4 cm	
10	If in two triangles ABC and PQR, AB/QR = BC/PR = CA/PQ, then: (a) △PQR ~ △CAB (b) △PQR ~ △ABC (c) △CBA ~ △PQR (d) △BCA ~ △PQR	
11	In Δ ABC, DE ∥ AB. If AB = a, DE = x, BE = b and EC = c. Then x expressed in terms of a, b and c is : (a) $\frac{ac}{b}$ (b) $\frac{ac}{b+c}$ (c) $\frac{ab}{c}$ (d) $\frac{ab}{b+c}$ 	
12	The length of a tangent drawn from a point at a distance of 10 cm from the centre of a circle of radius 6 cm is: (a) 8 cm (b) 12 cm (c) 4√6 cm (d) 10 cm	
13	If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80°, then ∠POA is equal to: (a) 50° (b) 60° (c) 70° (d) 80°	
14	If O is centre of a circle and Chord PQ makes an angle 50° with the tangent PR at the point of contact P, then the angle subtended by the chord at the centre is (a) 130° (b) 100° (c) 50° (d) 30° 	
15	From a point Q, the length of the tangent to a circle is 24 cm and the distance of Q from the centre is 25 cm. The radius of the circle is: (a) 7 cm (b) 12 cm (c) 15 cm (d) 24.5 cm	
16	The perimeter of a sector of a circle of radius 7 cm with central angle 90° is: (a) 25 cm (b) 11 cm (c) 18 cm (d) 22 cm	
17	If the radius of the base of a right circular cylinder is halved, keeping the height same, the ratio of the volume of the reduced cylinder to that of the original cylinder is:	

	(a) 1 : 4 (b) 1 : 2 (c) 2 : 1 (d) 4 : 1	
18	A solid sphere of radius r is melted and recast into the shape of a solid cone of height r. The radius of the base of the cone is: (a) 2r (b) r (c) 3r (d) 4r	
	DIRECTION for Q19 & Q20: In Question numbers 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.*	
19	Assertion (A): The point (0, 4) lies on the y-axis. Reason (R): The x-coordinate of any point lying on the y-axis is zero.	
20	Assertion (A): The value of sin θ = 4/3 is possible for some angle θ. Reason (R): For any acute angle θ, the value of sin θ is always less than or equal to 1.	
	SECTION B	
21	Prove that $2-5\sqrt{3}$ is an irrational number, given that √3 is an irrational number.	
22	Solve the following pair of linear equations: 2x + 3y = 11 and 2x - 4y = -24. **OR** Find the value of k for which the pair of linear equations x + 2y = 3 and 5x + ky + 7 = 0 has no solution.	
23	Evaluate: (sin 30° + tan 45° - cosec 60°) / (sec 30° + cos 60° + cot 45°).	
24	**A wheelchair ramp model** is made to a scale of 1:20. In the model, a triangular support has sides 3 cm, 4 cm, 5 cm. The corresponding sides of the actual support form a triangle similar to the model. 1. Find the lengths of the actual support's three sides. 2. A second support is similar to the first, but its shortest side is 90 cm}\). Find its longest side.	
25	Find the area of the sector of a circle with radius 6 cm if the central angle of the sector is 60°. (Use π = 22/7)	
	SECTION C	
26	A school has 96 notebooks and 120 pens to distribute equally among the greatest possible number of students, with no items left over. How many students can receive them? How many notebooks and pens will each student get?	
27	Find the zeroes of the quadratic polynomial $p(x) = 3x^2 - x - 4$ and verify the relationship between the zeroes and its coefficients	

28	The sum of two numbers is 35 and their difference is 13. Find the two numbers. **OR** Solve graphically the pair of linear equations: x - y + 1 = 0 and 3x + 2y - 12 = 0. Write the coordinates of the vertices of the triangle formed by these lines and the x-axis	
29	Prove the trigonometric identity: $\frac{tan\,\theta}{1-\cot\theta}+\frac{\cot\theta}{1-\tan\theta}=1+\sec\theta\,\text{cosec}\,\theta$ **OR** If tan(A + B) = √3 and tan(A - B) = 1/√3, where 0° < A + B ≤ 90° and A > B, find the measures of angles A and B.	
30	A solid toy is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π.	
31	Prove that the lengths of tangents drawn from an external point to a circle are equal	
	SECTION D	
32	A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. **OR** Two water taps together can fill a tank in 9⅜ hours . The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.	
33	State and prove Basic Proportionality Theorem (Thales Theorem). **OR** Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of triangle PQR . Show that △ABC ~ △PQR. 	
34	Prove that: (sin θ - cos θ + 1) / (sin θ + cos θ - 1) = 1 / (sec θ - tan θ).	
35	A circus tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the conical top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas required at the rate of ₹500 per m². (Note that the base of the tent will not be covered with canvas).	

36	India is rapidly emerging as a sporting powerhouse. An athletics academy in Kerala trains runners for 400 m track events. On Day 1 of practice, a sprinter completes a 400 m run in 70 seconds. To improve his performance, his coach plans a daily systematic routine where he reduces his timing by 2 seconds every subsequent day until he achieves his target timing of 50 seconds.  (i) Form an Arithmetic Progression representing his timing (in seconds) on consecutive practice days, writing its first term (a) and common difference (d). (ii) In how many days of practice will the athlete achieve his target time of 50 seconds? (iii) Calculate the total running time taken by the athlete across the first 10 days of practice combined. OR (iii) On which day of his training schedule will his timing be exactly 56 seconds?	[1] [1] [2]
37	To conduct Annual Sports Day activities in a rectangular school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD. Niharika runs 1/4th the distance AD on the 2nd line and posts a Green flag at point P. Preet runs 1/5th the distance AD on the 8th line and posts a Red flag at point Q.  (i)Write the coordinates of point P (Green flag) and point Q (Red flag). (ii) Find the shortest distance between both the flags (segment PQ). (iii) If Rashmi has to post a Blue flag exactly halfway between the line segment joining the two flags, on which line and at what distance should she post her flag? **OR** (iii) If Joy has to post a Yellow flag at point R which divides the line segment PQ internally in the ratio 1 : 3, find the coordinates of point R.	
38	Students of Class X visited a historical heritage site in Ernakulam as part of an educational tour. They observed a vertical tower with a flagstaff mounted at its top. From a point A on the level ground, 20 m away from the foot of the tower, the angle of elevation of the top of the tower is 30°, and the angle of elevation of the top of the flagstaff from the same point A is 60°. (i) Draw a neat labelled geometric diagram representing the given situation. (ii) Find the height of the vertical tower. (Use √3 ≈ 1.732 if required) (iii) Calculate the height of the flagstaff mounted on top of the tower. **OR** (iii) Find the distance between the top of the flagstaff and point A on the ground.	[1] [1] [2]