PONDA SCHOOLS' ASSOCIATION

JOINT FIRST TERMINAL EXAMINATION OCTOBER, 2018

Marks : **40** Sub : **MATHEMATICS** STD. : **X**

Date : **29:10:2018** SEAT NO. : | | | | | TIME : 1½ hrs

INSTRUCTIONS:

1. Answer each main question on a fresh page.
2. All questions are compulsory.
3. The question paper consists of eight questions, each of 10 marks.
4. Figures to the right indicate full marks.
5. Use of calculators and Mathematical tables is not permitted.
6. In geometrical constructions all construction lines and arcs should be retained.
7. Graph paper will be supplied on request.

Q.1. A) Select and write the most appropriate alternative from those provided in the brackets. (1)

If the sum and the product of zeros of a quadratic polynomial in ' x ' are - 5 and 3, then the quadratic polynomial is_____.

($x^2 + 2x + 3$, $x^2 + 5x + 3$, $x^2 - 5x + 3$, $x^2 + 3x - 3$)

B) Find the zeroes of the following polynomial and verify the relationship between the zeros and their coefficients. 2

$6x^2 - x - 1$

C) Apply division algorithm to find the quotient and the remainder by dividing the first polynomial by the second one. 3

$x^4 + 2x^3 + 3x^2 + 2x$; $x^2 + 2x + 2$

D) Determine all the zeroes of the polynomial $x^4 - x^3 + 8x^2 + 2x + 12$ if two zeroes are $\sqrt{2}$ and $-\sqrt{2}$. 4

Q.2. A) Select and write the most appropriate alternative from those provided in the brackets. 1

The equations $x - y + 6 = 0$ and $12x - 9y = 21$ have _____.

(Infinite solution, no solution, one solution, two solutions)

B) The following is a pair of linear equations in two variables. 2

$5x + y = 2$

$(k + 1)x + 7y = 14$

Answer the following questions with reference to given equations.

i) Write down the condition for infinitely many solutions.

ii) Find the value of k.

C) Find the solution of ANY ONE of the following 3

i) $6x + 5y = 9$ and $4x - 3y = 25$ (By elimination method)

ii) $x - 5y = 11$ and $2x + 3y = -4$ (By substitution method)

D) The sum of a two digit number and the number obtained after reversing the order of the digits is 165. If the digits differ by 3, find the numbers. 4

Q.3.A) **Select and write the most appropriate alternative from those provided in the brackets.** 1

The discriminant of the quadratic equation $4x^2 = 7x + 15$ is _____ (−196, −144, 196, 144)

B) **Find the roots of ANY ONE of the following quadratic equations.** 3

i) $3x^2 + 10 = 11x$ (By factorisation method)

ii) $8p^2 - 14x - 9 = 0$ (By using the quadratic formula)

C) The perimeter of a rectangle is 82 cm and its area is $400cm^2$. Find the dimensions of the rectangle. 3

D) Find the roots of the following quadratic equation by the method of completing square 3

$3x^2 - 5x + 2 = 0$

Q. 4 A) **Select and write the most appropriate alternative from those provided in the brackets.** 1

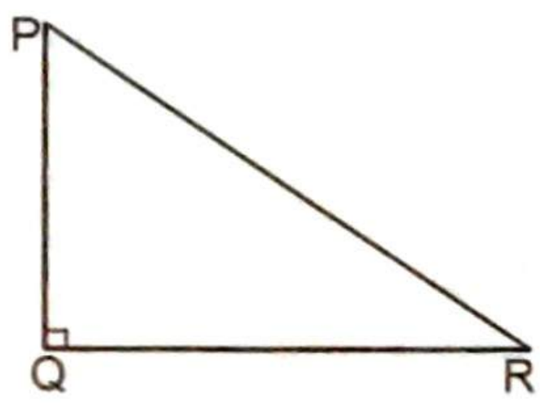
$\tan\theta$ is not defined for θ = _____ $(0^0, 3^0, 60^0, 90^0)$

B) In ΔPQR, $\angle Q = 90^0$, If Tan R = $\frac{5}{12}$ **then find:** 3

i) the length of PR.

ii) the value of sec R

iii) the value of Cosec P.



C) **Evaluate the following :** 3

$2\sin^2 45^2 + \text{Cosec}30^0 + 2\cos 60^2 - 6\tan^2 30^0$

D) **Prove that :** 3

$$\frac{\text{Cot A} + \text{Cosec A} - 1}{\text{Cot A} - \text{Cosec A} + 1} = \frac{1 + \text{Cos A}}{\text{Sin A}}$$

Q.5. A) **Select and write the most appropriate alternative from those provided in the brackets.** 1

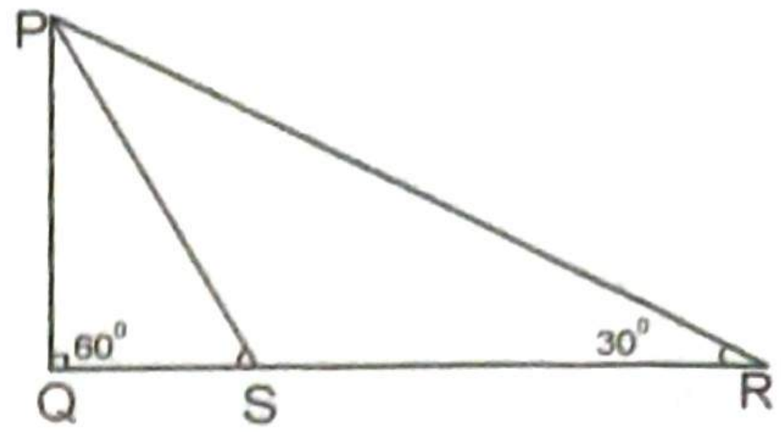
Two poles of height 5 m are standing opposite to each other on either side of the road. From a point which is at equal distance from both the poles, the angles of elevation to the top of both the poles are 45^0 each. Hence the distance between both the poles is _____ (2.5m, 5m, 10m, 25m)

B) **Attempt each of the following.** 2

i) For what value of k will the equation $9x^2 + 3kx + 4 = 0$ have equal roots

ii) Write the nature of the roots of the quadratic equation $3x + \frac{20}{3x} = 10$

C) A tree stands vertically on the bank of a river. From a point on the other bank exactly opposite the tree angle of elevation to the top of the tree is 60^0. From a point 20 m away from this point of the bank, the angle of elevation to the top of the tree is 30^0. Find the height of the tree and width of the river. (Take $\sqrt{3} = 1.73$) 3

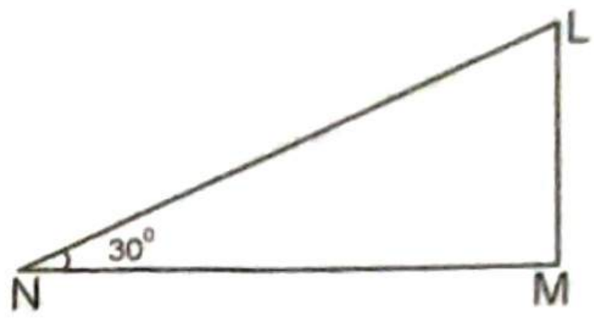


D) A vertical pole casts a shadow 21 m long when the angle made by its shadow with the ground is 30^0. 4

Find :

i) The height of the pole.

ii) The angle made with the ground when the length of the shadow is $7\sqrt{3}$.



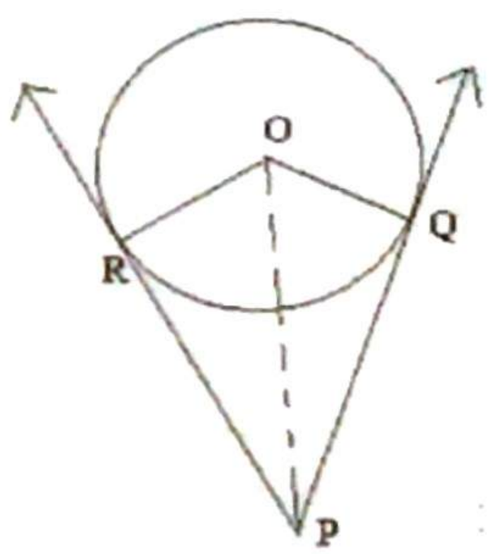
Q. 6 A) **Select and write the most appropriate alternative from those provided in the brackets.** 1

If PA and PB are two tangents to a circle with centre O, such that $\angle APO = 25^0$,

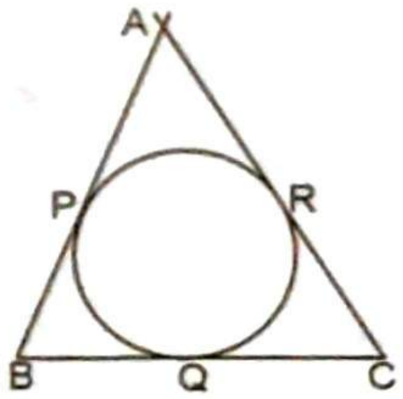
then $\angle AOB =$ _____ (25^0, 50^0, 100^0, 130^0)

B) **Given:** In adjoining figure Line PQ and PR are tangents to the circle with centre O at Q and R respectively. 3

Prove that : PR = PQ



C) A circle is circumscribed by Δ ABC which intersects the circle in points P, Q and respectively. If AB = 5 cm, BC = 8 cm and AC = 7 cm, find BP 3



D) **Solve the following pair of linear equation graphically.** (3)

$5x - y = 7$ and $x - y = -1$ (Plot at least 3 points)

Q.7. A) **Select and write the most appropriate alternative from those provided in the brackets.** (1)

$\Delta XYZ \sim \Delta PQR$, YZ = 3 cm, QR = 4 cm and ar(ΔXYZ) = 54cm^2 then ar(ΔPQR) = _____ cm. (17, 72, 96, 162)

B) **Attempt the following :**

i) Draw a line segment AB of length 6 cm and divide it in the ratio 3:4:5. Measure and state the length of the longest part. (2)

ii) D and E are points on side AC and BC of ΔABC. Determine if DE II AB if AC = 10, CD = 4, EC = 2 and BC = 5. (1)

C) Using a pair of compasses and ruler Construct Δ ABC with sides AB = 4 cm, BC = 5 cm and AC = 7 cm. and then construct Δ A'BC' similar to Δ ABC whose sides are $\frac{2}{3}$ of the corresponding sides of ΔABC. (3)

D) Using a pair of compasses and ruler draw a line segment PQ of length 7 cm. Taking 'P' as centre draw a circle of radius 2.5 cm. Construct tangents from point Q to the circle and state the length of the tangents. (3)

Q. 8. A) **Select and write the most appropriate alternative from those provided in the bracket.** (1)

If Δ ABC is similar to ΔDEF. $\angle A = 47^0$ and $\angle E = 83^0$ then $\angle C$ = _____

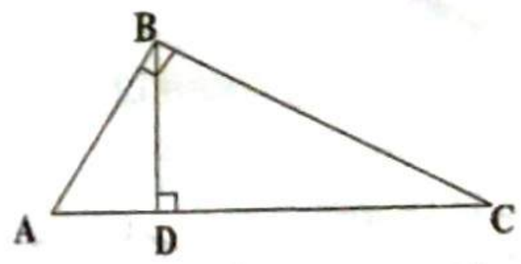
(80^0, 83^0, 50^0, 47^0)

B) With reference to the given figure and the given condition, write only the proof with reason of the following theorem. (3)

Given : In Δ ABC, $\angle ABC = 90^0$,

BD $\perp$ AC.

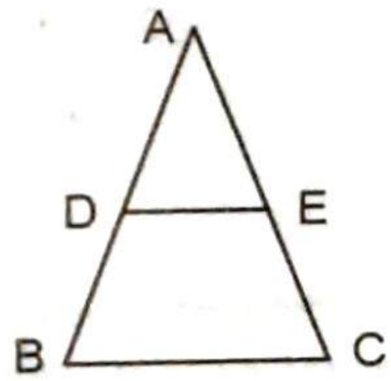
Prove that : $AC^2 + = AB^2 + BC^2$



C) D and E are points on side AB and AC of Δ ABC and DE is parallel to BC. If AD = 8 cm, BD = 4 cm and AE = 3 cm, find

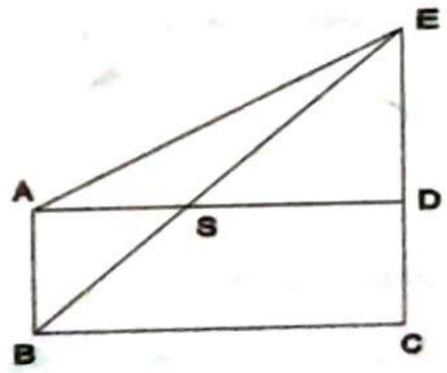
i) Length of AC. (1)

ii) If ar(Δ ADE) = 36cm^2, find ar(Δ ABC) (2)



D) ABCE is a trapezium in which AB II EC and AD II BC. AD and EB intersect each other in point S.

Prove that : ED · AS = DC · DS.



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