(4)

GREENLAWNS HIGH SCHOOL
FINAL EXAMINATION YEAR 2017

SUBJECT : MATHEMATICS CLASS : IX
TIME : 2 ½ HOURS MARKS : 80

---

**Note**: Attempt all questions from Section A and any four questions from Section B. All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer. Omission of essential working will result in loss of marks. The intended marks for questions or parts of questions are given in brackets ( ).

## Section A (40 Marks)

**Attempt all questions from this Section.**

**Question 1.**

a) If a and b are rational numbers, find the values of a and b in the following [3]

$$\frac{3\sqrt{2} + 2\sqrt{3}}{5\sqrt{2} - 4\sqrt{3}} = a - b\sqrt{6}$$

b) Factorise [3]

$32x^4 - 500x$

c) The sides of a right triangle containing the right angle are $(3x)$ cm and $(x - 1)$ cm. [4] If the area of the triangle is $84\text{cm}^2$, calculate the length of the sides of the triangle.

**Question 2.**

a) The numbers 5,7,8,10, $2x - 7$, $2x + 16$, 34,42,45,50 are arranged in ascending order. If their median is 25 find $x$. [3]

b) Two parallel chords of a circle are 14cm and 48cm long. If the distance between them is 31 cm and they lie on the opposite sides of the centre, find the radius of the circle. [3]

c) If $x + \frac{1}{x} = 4$ find the value of [4]

i) $x^2 + \frac{1}{x^2}$ ii) $x^3 + \frac{1}{x^3}$ iii) $x - \frac{1}{x}$

**Question 3.**

a) Mr. Nandu borrowed Rs.25000 for two years. The rate of interest for the two successive years are 8% and 10% respectively. If he repays Rs. 7000 at the end of the first year, find the outstanding amount at the end of the second year. [3]

b) Construct a regular hexagon of side 4.6 cm. Construct a circle circumscribing the hexagon. Measure and record the radius of the circle. [3]

... 2/-

c) A mathematics aptitude test of 50 students was recorded as follows. [4]

| Marks | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
|---|---|---|---|---|---|
| No. of students | 4 | 8 | 14 | 19 | 5 |

Draw a histogram for the above data using a graph paper and locate the mode.

**Question 4.**

a) Simplify [3]

$$\frac{7^{2n+3} \quad 49^{n+2}}{[(343)^{n+1}]^{2/3}}$$

b) Without using trigonometric tables, find the value of [3]

$2\sqrt{2}\ \cos 45°\cos 60° + 2\sqrt{3}\ \sin 30°\ \tan 60° - \cos 0°$

c) Find the co-ordinates of the circumcentre of $\triangle$ ABC where A (6, -5) , B(6,7) and C (8,7) [4]

**SECTION B (40 Marks)**

**(Answer any four questions from this section)**

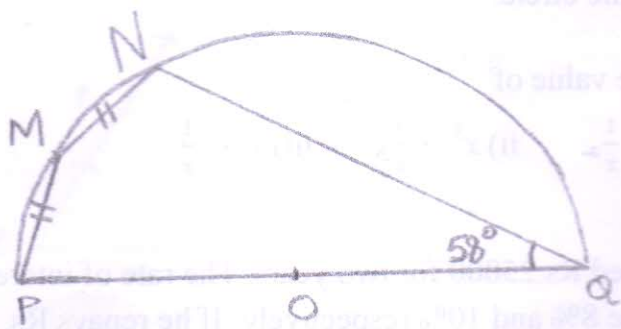
**Question 5.**

a) The volume of a cuboidal block of silver is 10368 $cm^3$, If its dimensions are in the ratio 3:2:1, find [3]

i) the dimensions of the block

ii) the cost of gold polishing its entire surface at Rs. 5.50 per $cm^2$.

b) In the semicircle with centre O, chord PM = chord MN. $\angle PQN = 58°$, Find $\angle MPQ$. [3]




c) Calculate the mean of the following frequency distribution by step-deviation method

| x | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 |
|---|---|---|---|---|---|---|---|---|---|
| f | 5 | 8 | 11 | 20 | 23 | 18 | 13 | 3 | 1 |

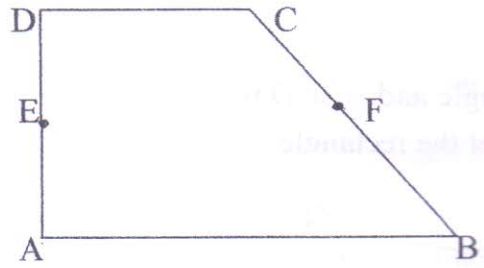
**Question 6**

a) Prove that

$$\frac{\text{Cos}\,\theta}{\text{Cosec}\theta + 1} \quad \frac{\text{Cos}\,\theta}{\text{Cosec}\theta - 1} = 2\tan\theta$$ [4]

b) In the figure given below E and F are respectively the midpoints of non-parallel sides AD and BC of trapezium ABCD. [4]

Prove that : EF ∥ AB and EF $= \frac{1}{2}$ (AB + CD)




c) Solve the following equation for x [2]

$$\left(\sqrt{\frac{3}{5}}\right)^{x+1} = \frac{125}{27}$$

**Question 7.**

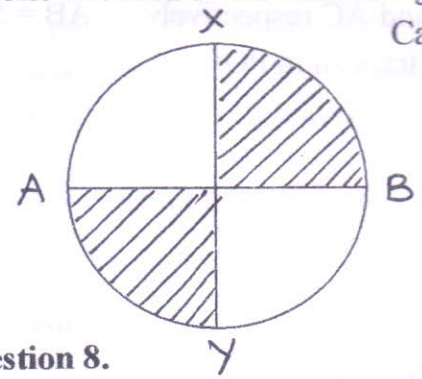
a) Calculate the Compound Interest on Rs 10240 at 12 ½ % p.a. compounded half-yearly for 1 year [3]

b) Draw a circle of radius 3.5 cm. Draw two tangents to this circle so that the angle between them is 45°. Measure and record the length of the tangent segments. [3]

c) In the figure given below XY and AB are two perpendicular diameters of the circle. The area of the shaded region is 693 $cm^2$. (Take $\pi = 22/7$) [4]

Calculate : i) the radius of the circle.

ii) the perimeter of the shaded region.




**Question 8.**

a) Marks obtained by 200 children in an examination are given below: [5]

| Class Interval | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 7 | 5 | 12 | 20 | 35 | 36 | 40 | 28 | 9 | 8 |

...4/-

Draw an ogive for the given distribution taking 2cm = 10 marks on one axis and 2 cm = 20 students on the other axis. Using the graph determine

i) the median marks

ii) the number of students who failed if minimum marks required to pass is 40.

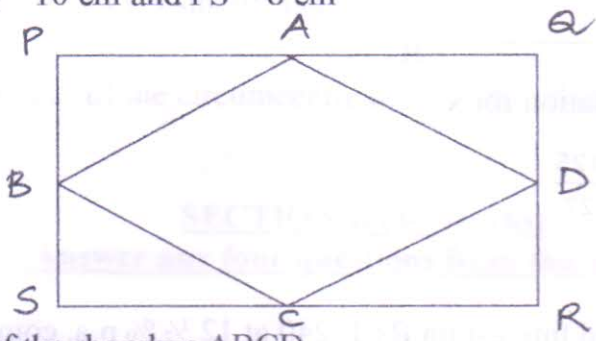
iii) if scoring 90 and more marks is considered as grade one, find the number of students who secured grade one in the examination.

b) Evaluate without using the trigonometric tables [3]

$\cos^2 36° + \text{Cos } 54° \text{ Sin } 36°$

c) In the figure given below PQRS is a rectangle and ABCD is a rhombus whose vertices are midpoints of the sides of the rectangle. [2]

Given that PQ = 10 cm and PS = 8 cm



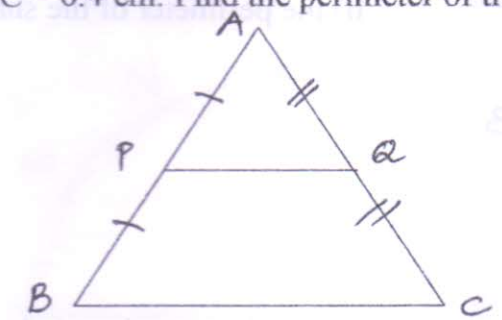

Find i) the area of the rhombus ABCD

ii) the area of $\triangle$ AQD

**Question 9.**

a) The diameter of a circular park is 84 metres. A 3.5 m wide road runs on the outside around it. Find the cost of constructing the road at Rs. 20 per square metre. [3]

b) In $\triangle$ ABC, P and Q are midpoints of sides AB and AC respectively. If AB = 5.6 cm, BC = 8cm and AC = 6.4 cm. Find the perimeter of trapezium PQCB.




a) Evaluate [4]

$$\frac{4}{(216)^{-2/3}} + \frac{1}{(256)^{-3/4}} + \frac{2}{(243)^{-1/5}}$$

— x —