

Final Term Examination 2017-2018

Std. : IX A,B,C,D,E
Subject : Mathematics

Full Marks : 80
Time : 2½hrs.+15min.

Section — A

Attempt all the questions from this section.

- QI.** (a) Rationalise $\frac{2}{\sqrt{5} + \sqrt{3} + \sqrt{2}}$ [3]
- (b) If $x^2 + \frac{1}{x^2} = 7$
find (i) $x + \frac{1}{x}$ (ii) $x - \frac{1}{x}$ (iii) $2x^2 - \frac{1}{x^2}$ [3]
- (c) Factorise the following : [4]
- (i) $a^4 - 11a^2 + 10$
- (ii) $2a^3 + 16b^3 - 5a - 10b$
- QII.** (a) Solve for x and y [3]
- $41x + 53y = 135$
 $53x + 41y = 147$
- (b) If $5^{2x-1} = 25^{x-1} + 100$ find 3^{1+x} [3]
- (c) Solve for x : $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$. [4]
- QIII.** (a) Find x° , y° and z° [3]
- (b) $\angle D = 90^\circ$, AB = 16 cm, BC = 12cm. and CA = 6cm find CD. [3]

(c) If the medians of a triangles ABC intersect at G. Prove that area of $\Delta BCG = \frac{1}{3}$ area of ΔABC .

QIV. (a) Find the area of trapezium ABCD. [3]

(b) If $\frac{\sec\theta + \tan\theta}{\sec\theta - \tan\theta} = \frac{4}{1}$ then find $\sin\theta$ [3]

(c) ABCD is a square of side 14cm.
A,B,C and D are centres of arcs
of equal radius find the perimeter
and Area of the shaded region. [4]

SECTION — B

Attempt any four questions from this section.

Q5. (a) Find the value of $\frac{\cos 77^\circ}{\sin 13^\circ} + \sin^2 52^\circ + \sin^2 38^\circ - 3 \tan^2 45^\circ$ [3]

(b) Find the value of x & y, [3]

(c) A wire when bent in the form of an equilateral triangle encloses an area of $36\sqrt{3}$ cm². Find the area enclosed by the same wire when bent to form (i) a square (ii) a rectangle when length is 2cm more the width.

Q6. (a) In ΔABC $\angle A = 90^\circ$ If $AB = 7$ cm and $BC - AC = 1$ cm find (i) $\sin C$ (ii) $\tan B$ [3]

(b) Solve for x : [3]

$$5^{\log x} + 3^{\log x} = 3^{\log x + 1} - 5^{\log x - 1}$$

- (c) ABCDE is a regular Pentagon find x° , y° and z° with giving reasons.

Q7. (a) Six years hence a man's age will be three times his son's age, and three year's ago he was nine times as old as his son. Find their present ages. [3]

(b) Solve for x $4^{x-1} \times (0.5)^{3-2x} = \left(\frac{1}{8}\right)^x$ [3]

(c) Construct a parallelogram with diagonals 6 cm and 8 cm in length and angle between them is 60° . Measure the longer side. [4]

Q8. (a) Draw a histogram for the following data and frequency Polygon of it. [4]

Wt. in kg	40–44	45–49	50–54	55–59	60–64	65–69
No. of students	2	8	12	10	6	4

(b) In the figure $\angle ABC = 90^\circ$, O is the centre of semicircle. Find Perimeter and area of shaded region ($\pi = 3.142$) AB = 12 cm BC = 16 cm. [4]

(c) Find a and b $\frac{2 + 3\sqrt{3}}{4 - 5\sqrt{3}} = a + b\sqrt{3}$ [2]

Q9. (a) In the figure AE // BC and BE // CD Prove that area of $\triangle ABC =$ area of $\triangle EBD$. [4]

(b) If $x = 5 - 2\sqrt{6}$ find $\sqrt{x} + \frac{1}{\sqrt{x}}$. [3]

(c) Factorise $(2x^2 + 5x)(2x^2 + 5x - 19) + 84$ [3]

Q10. (a) ABCD is a rhombus whose diagonal AC makes an angle α with AB. If $\cos \alpha = \frac{2}{3}$ and OB = 3cm find the side of the rhombus. [4]

(b) ABCDE is a pentagon in which $AE \parallel BC$, $\angle C = 153^\circ$, $\angle D = x^\circ$ and $\angle E = 2x^\circ$ find x° . [4]

(c) Find X $4^{2x} = \frac{1}{32}$. [2]

Q11. (a) Construct an equilateral triangle of side 5 cm and draw its incircle. [4]

(b) A man invests Rs. 1200 for two years at compound Interest. After one year the money amounts to Rs. 1275. Find the interest for the second year correct to the nearest rupee. [3]

(c) Prove

$$2 \log \frac{11}{13} + \log \frac{130}{77} - \log \frac{55}{91} = \log 2$$
 [3]