

SUMMATIVE ASSESSMENT-I, 2016

MATHEMATICS

Time : 3 hrs.

Class – X

M.M. : 90

Date : 23.09.2016

General Instructions:

- All questions are **compulsory**.
- The question paper consists of **31 questions** divided into four sections A, B, C and D. **Section-A** comprises **4 questions** of **1 mark** each; **Section-B** comprises **6 questions** of **2 marks** each; **Section-C** comprises **10 questions** of **3 marks** each and **Section-D** comprises **11 questions** of **4 marks** each.
- There is no overall choice.
- Use of calculator is not permitted.
- **Graph paper** is required in question no. **23 & 30**.

SECTION-A

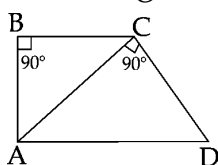
Question numbers 1 to 4 carry one mark each.

- Q.1** In ΔXYZ , A and B are points on the sides XY and XZ respectively such that $AB \parallel YZ$. If $AY=2.2$ cm, $XB=3.3$ cm and $XZ=6.6$ cm, then find AX. (1)
- Q.2** In ΔABC , A, B and C are interior angles of ΔABC , then prove that : (1)
- $$\sin \frac{(A+C)}{2} = \cos \frac{B}{2}$$
- Q.3** If $x=3 \sin \theta$ and $y=4 \cos \theta$, find the value of $\sqrt{16x^2 + 9y^2}$. (1)
- Q.4** Write the empirical relationship between the three measures of central tendency. (1)

SECTION-B

Question numbers 5 to 10 carry two marks each.

- Q.5** Explain why (11373534333213) is a composite number ? (2)
- Q.6** Write the decimal expansion of $\frac{1717}{2^3 \cdot 5^3}$ without actual division. (2)
- Q.7** For what value of k does the pair of equations given below has a unique solution ? (2)
- $$y = 2x + 56$$
- $$3kx = 12y + 57$$
- Q.8** In the figure, find AD, if $AB=BC=1$ cm and $CD=5\sqrt{2}$ cm. (2)



- Q.9** If $\cos(A+B) = \frac{1}{2}$ and $5 \sin(A-2B)$, then find A and B, when it is given that $A+B$ (2)

and $\angle A$ and $\angle B$ are acute angles.

- Q.10** In a class test, 50 students obtained marks as follows : (2)

Marks obtained	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of students	4	6	25	10	5

Find the modal class and the median class.

SECTION-C

Question numbers 11 to 20 carry three marks each.

- Q.11** Find HCF of 306 and 657. Also find their LCM using their HCF (3)

- Q.12** If $x^3 + 26x^2 + 16x + k$ is completely divisible by $x + 3$, then find the value of k . (3)

- Q.13** Quadratic polynomial $4x^2 + 12x + 9$ has zeroes as α and β . Now form a quadratic polynomial whose zeroes are $\alpha + 1$ and $\beta + 1$. (3)

- Q.14** Solve for x and y : (3)

$$2x + 5y = 14$$

$$3x + 2y = 11$$

- Q.15** If in a right $\triangle ABC$, right angled at B , D is any point on BC , then prove that $AC^2 = AD^2 + DC^2 + 2BD \cdot DC$. (3)

- Q.16** $\triangle ABC$ and $\triangle DBC$ are two triangles on the opposite side of BC and on the same base BC . If AD intersects BC at O , show that : $\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DBC)} = \frac{AO}{DO}$ (3)

- Q.17** Evaluate : (3)

$$\frac{\sin 25^\circ}{\cos 65^\circ} + \frac{\operatorname{cosec} 34^\circ}{\sec 56^\circ} - \frac{2 \cos 43^\circ \cdot \operatorname{cosec} 47^\circ}{\tan 10^\circ \cdot \tan 40^\circ \cdot \tan 50^\circ \cdot \tan 80^\circ}$$

- Q.18** Prove that : (3)

$$\frac{\sec u + \tan u}{\sec u - \tan u} = 5 \left(\frac{1 + \sin u}{\cos u} \right)^2$$

- Q.19** Find the mean of the following frequency distribution using step deviation method : (3)

Class interval	0-25	25-50	50-75	75-100	100-125
Frequency	3	5	7	3	2

- Q.20** Find the mode of the following frequency distribution of marks obtained by 50 students : (3)

Marks obtained	0-10	10-20	20-30	30-40	40-50
Number of students	5	12	20	10	3

SECTION-D

Question numbers 21 to 31 carry four marks each.

- Q.21** State Euclid division Lemma. Using it show that square of any positive (4)

integer is either of the form $5m$ or $5m \pm 1$, where m is an integer.

Q.22 Obtain all other zeroes of the polynomial $x^4 - 16x^3 + 1x^2 - 224x + 220$, if two of its zeroes are 12 and 25. (4)

Q.23 Solve graphically the pair of linear equations : (4)

$$3x + 2y = 13 \quad 5x + 0 = 21 \quad 5x + 0 = 21$$

Find the coordinates of the vertices of triangular region formed by these lines and x – axis. Also calculate the area of this triangle.

Q.24 A man started his job with a certain monthly salary, and earned a fixed increment every year. His salary was ₹ 15,000 after 4 years of service and ₹ 18,000 after 10 years of service. What was his starting salary and his annual increment? What character you can imbibe from his life? (4)

Q.25 On three line segments OA, OB and OC there are points L, M and N respectively such that $LM \parallel AB$ and $MN \parallel BC$. If L, M, N and A, B, C are non-collinear points, then prove that $LN \parallel AC$. (4)

Q.26 If $\Delta ABC \sim \Delta PQR$ and $ar(\Delta ABC) = 5 ar(\Delta PQR)$, then prove that $\Delta ABC \cong \Delta PQR$. (4)

Q.27 If $A = \frac{1}{2} \cos^{-1} \frac{5}{8}$, prove that : (4)

$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B}} = 2 \frac{\sin^2 B}{\cos^2 A} = 5 \tan A$$

Q.28 If $\operatorname{cosec} A = 2 \cot A = 5q$, then show that $\frac{q^2 - 2}{q^2 + 1} = \frac{1}{5} \cos A$. (4)

Q.29 Prove that : (4)

$$\left(\frac{\sin A}{12 \cos A} + \frac{12 \cos A}{\sin A} \right) \cdot \left(\frac{\cos A}{12 \sin A} + \frac{12 \sin A}{\cos A} \right) = 54$$

Q.30 Production yield per hectare of wheat of some farms of a village are given in the following table : (4)

Production yield (in kg/ha)	40-45	45-50	50-55	55-60	60-65	65-70	70-75	75-80	80-85
Number of farms	1	9	15	18	40	26	16	14	10

Draw a 'less than type' ogive and a 'more than type' ogive for this data.

Q.31 On the Sports day of a school, 300 students participated. Their ages are given in the following distribution : (4)

Age (in years)	5-7	7-9	9-11	11-13	13-15	15-17	17-19
Number of students	67	33	41	95	36	13	15

Find the mean and mode of the data.



