UNIVERSAL EDUCATION CENTRE

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SUMMATIVE ASSESSMENT – I (2015 – 2016)

MATHEMATICS

Class – X

Time allowed: 3 hours | Maximum Marks: 90

General Instructions:

a) All questions are compulsory.

b) The question paper consists of 31 questions divided into four sections – A, B, C and D.

c) Section A contains 4 questions of 1 mark each which are multiple choice questions, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D contains 11 questions of 4 marks each.

d) Use of calculator is not permitted.

Section A

Q.1 Rational number $\frac{p}{q}$, $q \neq 0$ will be terminating decimal if the prime factorisation of q is of the form. (m and n are non negative integers) :

(A) $2^m \times 3^n$ (B) $2^m \times 5^n$ (C) $3^m \times 5^n$ (D) $3^m \times 7^n$

Q.2 If $\sin(20 + \theta) = \cos 30^\circ$, then the value of θ is :

(A) 20° (B) 50° (C) 30° (D) 40°

Q.3 In the figure given below, if DE ∥ BC, then x equals :

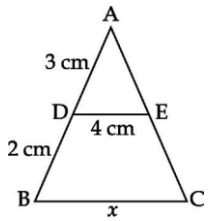


Figure - 2

(A) 3 cm (B) 2 cm (C) 4 cm (D) 6.7 cm

Q.4 If $\cot A = \frac{12}{5}$, then the value of (sin A + cos A) x cosec A is :

(A) $\frac{13}{5}$ (B) $\frac{17}{5}$ (C) $\frac{14}{5}$ (D) 1

Section B

Q.5 If $(x + 1)$ is a factor of $2x^3 + ax^2 + 2bx + 1$, then find the values of a and b given that $2a - 3b = 4$.

Q.6 ΔABC is a right triangle right angled at $\angle C$, then find the value of $\text{cosec}^2 A - \tan^2 B$.

Q.7 Check whether $119^2 - 111^2$ is a prime number or a composite number.

Q.8 Find The number of solutions of the pair of linear equations $x + 2y - 8 = 0$ and $2x + 4y = 16$.

Q.9 Solve: $\left(\frac{\cos A}{\cot A} + \sin A\right)$

Q.10 The mean of 5 observations x, $x + 2$, $x + 4$, $x + 6$ and $x + 8$ is 11, then find the value of x.

Section C

Q.11 Is 7 x 6 x 5 x 4 x 3 x 2 x 1 + 5 a composite number ? Justify your answer.

Q.12 Form a quadratic polynomial whose one of the zeroes is - 15 and sum of the zeroes is 42.

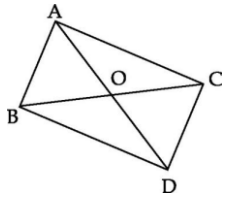
Q.13 Is the system of linear equations $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ consistent ? Justify your answer.

Q.14 Prove that $\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2 \sec A$

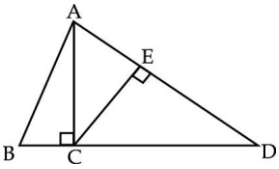
OR

Without using trigonometric tables prove that : $\tan 1° \tan 11° \tan 21° \tan 69° \tan 79° \tan 89° = 1$

Q.15 In the figure given below, ABC and DBC are two triangles on the same base BC. If AD intersect BC at O then show that : $\frac{ar(ABC)}{ar(DBC)} = \frac{AO}{DO}$



Q.16 In the given figure, AC ⊥ BD and CE ⊥ AD. Prove that $AC^2 = DA.AE$.



Q.17 Find the mean age of the following data.

Age (yrs)	10 – 30	30 – 50	50 – 70	70 – 90
No. of persons	15	12	18	5

Q.18 Find the mode of the following distribution :

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	15	18	16	5	6

Q.19 Use Euclid's division lemma to show that cube of any positive integer is either of form 9q, 9q + 1, or 9q + 8 for some integer q.

Q.20 Show that any positive odd integer is of the form 4q + 1 or 4q + 3 where q is a positive integer.

OR

An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march ?

Section D

Q.21 Solve for x and y $\frac{5}{x-1} + \frac{1}{y-2} = 2$; $\frac{6}{x-1} - \frac{3}{y-2} = 1$

OR

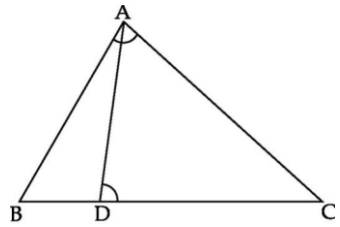
The students of a class are made to stand in rows. If three students are extra in each row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.

Q.22 Find the values of a and b so that the polynomial $p(x) = x^4 + x^3 + 8x^2 - ax + b$ is exactly divisible by $x^2 - 1$.

Q.23 If $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$, prove that $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$.

Q.24 If A, B, C are interior angles of ΔABC, show that : $\cos^2\frac{A}{2} + \cos^2\left(\frac{B+C}{2}\right) = 1$

Q.25 In figure above, D is a point on the side BC of ΔABC such that ∠BAC = ∠ADC.
Prove that $CA^2 = CB \times CD$.



Q.26 In the figure given below, AD ⊥ BC. Prove that $AB^2 + CD^2 = BD^2 + AC^2$:

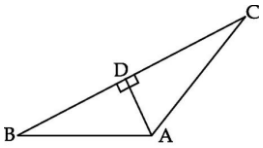


Figure - 6

Q.27 The mean of the following frequency distribution is 25. Determine the value of p

Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 - 50
Frequency	5	18	15	P	6

OR

The distribution below gives the weight of 30 students of a class. Find the median weight of the students.

Weight in kg	40 – 45	45 – 50	50 – 55	55 – 60	60 – 65	65 – 70	70 – 75
No. of students	2	3	8	6	6	3	2

Q.28 Find the median of the following data

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	Total
Frequency	8	16	36	34	6	100

Q.29 Sum of the two zeroes of a polynomial of degree 4 is - 1 and their product is - 2. If other two zeroes are $\sqrt{3}$ and $-\sqrt{3}$. Find the polynomial.

Q.30 Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

OR

The areas of two similar triangles are 49 cm^2 and 64 cm^2 respectively. If the difference of the corresponding altitudes is 10 cm, then find the lengths of altitudes (in centimeters).

Q.31 Prove that $\cos^8\theta - \sin^8\theta = (\cos^2 - \sin^2\theta)(1 - 2\sin^2\theta\cos^2\theta)$:

OR

Prove that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$.

ALL THE BEST