AES

(16)

SUMMATIVE ASSESSMENT – I, 2015-16
MATHEMATICS
Class – X

Time Allowed: 3 hours　　　　**Maximum Marks: 90**

General Instructions:

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

SECTION-A

Question numbers **1** to **4** carry one mark each

1. In ΔDEW, $AB \| EW$. If $AD = 4$ cm, $DE = 12$ cm and $DW = 24$ cm, then find the value of DB.　1

2. In a triangle ABC, write $\cos\dfrac{B+C}{2}$ in terms of angle A.　1

3. Find the value of $\dfrac{1-\cos\theta}{1+\cos\theta}$, when $\theta = 90°$.　1

4. Find median of the data , using an empirical relation when it is given that mode $= 12.4$ and mean $= 10.5$.　1

SECTION-B

Question numbers **5** to **10** carry two marks each.

5. Show that 14^n cannot end with digit 0 for any natural number n.　2

6. Explain why $5 \times 7 \times 9 + 7$ is a composite number.　2

7. Find a quadratic polynomial,　the sum and product of whose zeroes are $\dfrac{2}{5}$ and -1　2
respectively.

8. In an isosceles ΔABC right angled at B, Prove that $AC^2 = 2AB^2$.　2

9. Prove the following identity.　2

$$\left(1+\frac{1}{\tan^2 A}\right) \cdot \left(1+\frac{1}{\cot^2 A}\right) = \frac{1}{\cos^2 A - \cos^4 A}.$$

10 Find the arithmetic mean of the following frequency distribution : 2

x_i	3	4	5	7	10
f_i	3	4	8	5	10

SECTION-C

Question numbers **11** to **20** carry three marks each.

11 Find HCF of the numbers 1405, 1465 and 1530 by Euclid's division algorithm. 3

12 The difference between the two supplementary angles is 22°. Find the angles. 3

13 If one zero of a polynomial $2x^3 + x^2 - 7x - 6$ is 2, then find all the zeroes. 3

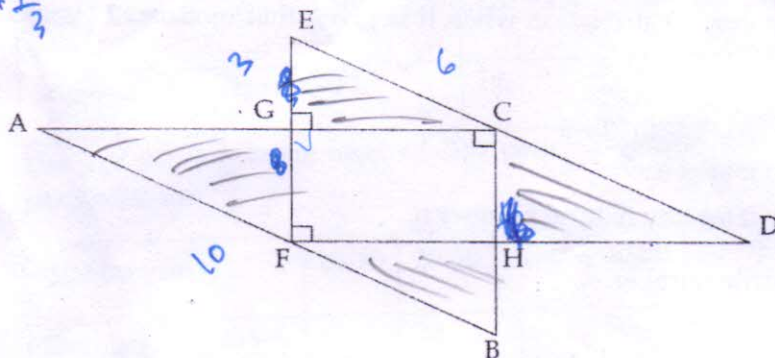14 Solve the following pair of equations for x and y : 3

$$\frac{4}{x} + 5y = 7$$

$$\frac{3}{x} + 4y = 5$$

15 In given figure ED∥AB, AB=10 cm, BC=6 cm, AC=8 cm and GE=3 cm. List all similar 3
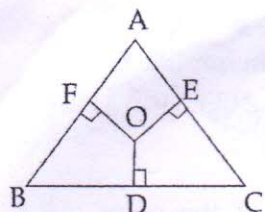triangles. How many pairs of similar triangles are possible ?

16 In ΔABC, from any interior point O off the triangle, OD ⊥ BC, OE⊥AC and OF ⊥ AB are 3
drawn.

Prove that $OA^2 + OB^2 + OC^2 = OD^2 + OE^2 + OF^2 + AF^2 + BD^2 + CE^2$.

17 In $\triangle ABC$, right angled at C, if $\tan A = \dfrac{1}{\sqrt{3}}$, show that $\sin A . \cos B + \cos A . \sin B = 1$.   3

18 Prove that :   3

$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

19 The arithmetic mean of the following frequency distribution is 25. Determine the value of p.   3

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

20 A school conducted a test (of 100 marks) in English for students of Class X. The marks obtained by students are shown in the following table :   3

Marks obtained	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Number of students	1	2	4	15	15	25	15	10	2	1

Find the modal marks.

SECTION-D

Question numbers **21** to **31** carry four marks each.

21 Write the HCF and LCM of the smallest odd composite number and the smallest odd prime number. If an odd no. p divides q^2 then will it divide q^3 also ? Explain.   4

22 4 chairs and 3 tables cost ` 2100 and 5 chairs and 2 tables cost `1750. Find the cost of one chair and one table separately.   4

23 If a polynomial $-2x^4 - 3x^3 + 6x^2 + 3x - 2$ is divided by another polynomial $-2x^2 - 3x + 4$, then remainder is $px + q$. Find the value of p and q.   4

24 DDA wants to make a rectangular park in the colony. If the length and breadth of the park is decreased by 2 m, then its area will be decreased by 196 square meters. Its area will be   4

increased by 246 square meters if its length is increased by 3 m and its breadth is increased by 2 m. Find the length and breadth of the park.What is the importance of parks in our life ?

25. In $\triangle ABC$, from A and B altitudes AD and BE are drawn. Prove that $\triangle ADC \sim \triangle BEC$. Is $\triangle ADB$ $\sim \triangle AEB$ and $\triangle ADB \sim \triangle ADC$? 4

26. If two poles 5 m and 15 m high are 100 m apart, then find the height of the point of intersection of the line joining the top of each pole to the foot of the opposite pole ? 4

27. If $cosec(A+B) = 1$ and $cosec(A-B) = 2$, evaluate : 4

   (i) $sinAcosB + cosAsinB$.

   (ii) $\dfrac{tanA + tanB}{1 - tanA.\,tanB}$

28. Prove that : 4

$$\frac{sinA + cosA}{sinA - cosA} + \frac{sinA - cosA}{sinA + cosA} = \frac{2}{1 - 2cos^2A}$$

29. Prove that : 4

$$(1 + cot^2\theta).(1 + cos\theta).(1 - cos\theta) = (1 + tan^2\theta).(1 + sin\theta)(1 - sin\theta) = 1$$

30. The following table gives the daily income of 50 workers of a factory. Draw both types ("less than type" and "greater than type") ogives 4

Daily income (in ₹)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200
Number of workers	12	14	8	6	10

31. The following are the ages of 200 patients getting medical treatment in a hospital on a particular day : 4

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70
Number of Patients	40	22	35	50	23	30

Write the above distribution as less than type cumulative frequency distribution and also draw an ogive to find the median.

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