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संकलित परीक्षा - I, 2016-17
SUMMATIVE ASSESSMENT - I, 2016-17
गणित / MATHEMATICS
कक्षा - X / Class - X

निर्धारित समय:3 hours | अधिकतम अंक : 90

Time Allowed: 3 hours | Maximum Marks: 90

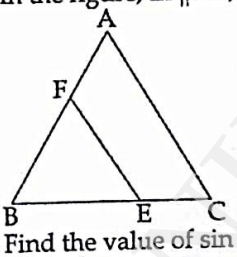
General Instructions:

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 the figure, EF||AC, BC = 10 cm ,AB = 13 cm and EC = 2 cm, find AF. 1



2 Find the value of $\sin 38° - \cos 52°$. 1

3 If $x = 3\sin\theta$ and $y = 4\cos\theta$, find the value of $\sqrt{16x^2 + 9y^2}$. 1

4 Find the mean of the data, using an empirical formula, when it is given that mode = 50.5 and median = 45.5. 1

SECTION-B

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

5 Show that 8^n can never end with digit 0 for any natural number n. 2

6 Find the prime factorisation of the denominator of the rational number equivalent to 8.39. 2

7 Given the linear equation $3x + 4y = 9$write another linear equation in these two variables such that the geometrical representation of the pair so formed is : 2

(i) intersecting lines (ii) coincident lines

8 In an equilateral triangle of side 24cm, find the length of the altitude. 2

9 If $x = p\sec\theta + q\tan\theta$ and $y = p\tan\theta + q\sec\theta$, then prove that $x^2 - y^2 = p^2 - q^2$. 2

10 The following table shows the daily consumption of milk in 40 houses of a locality : 2

Consumption (in litres)	0 - 0.5	0.5 - 1	1 - 1.5	1.5 - 2	2 - 2.5
Number of houses	7	15	10	5	3

Find the modal class and median class for the data.

SECTION-C

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

11 Find LCM of 92 and 510. Also find their HCF by using LCM. 3

12 If $x^3 - 6x^2 + 6x + k$ is completely divisible by $x - 3$, then find the value of k. 3

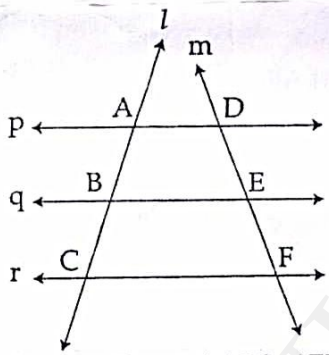
13 If two zeroes of a polynomial $x^3 - 3x^2 + 2$ are $1 + \sqrt{3}$ and $1 - \sqrt{3}$, then find the third zero. 3

14 Solve for x and y : 3

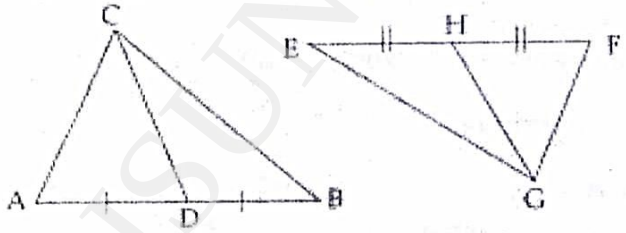
$$\frac{11}{x} - \frac{1}{y} = 10$$

$$\frac{9}{x} - \frac{4}{y} = 5$$

15 Three parallel lines p, q and r are intersected by two transversals l and m at A, B, C and D, E, F respectively as shown in the figure. Prove that $\frac{AB}{BC} = \frac{DE}{EF}$. 3



16 In given figure $\Delta ABC \sim \Delta FEG$, also $AD = DB$ and $FH = HE$ 3



prove that

(a) $\frac{CD}{GH} = \frac{AB}{FE}$

(b) $\Delta ADC \sim \Delta FHG$

17 If $4 \sin\theta = 3 \cos\theta$, find the value of : $\frac{12 \sin\theta - 7 \cos\theta}{8 \sin\theta + 3 \cos\theta}$ 3

18 Prove the following identity. 3

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

19 In a health check up, the number of heart beats of 40 women were recorded in the following table : 3

Number of heart beats/minute	65-69	70-74	75-79	80-84
Number of women	2	18	16	4

Find the mean of the data.

20 Calculate the mode of the following distribution table : 3

Marks	No. of students
25 or above 25	52
35 or above 35	47
45 or above 45	37
55 or above 55	17
65 or above 65	8
75 or above 75	2
85 or above 85	0

SECTION-D

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

21 The product of two numbers x and y is 217728. Find the LCM and HCF of x and y if it is given that $LCM(x, y) = 42.HCF(x, y)$. 4

22 Obtain all other zeroes of the polynomial $x^4+6x^3+x^2-24x-20$, if two of its zeroes are $+2$ and -5. 4

23 Solve graphically the pair of linear equations : 4
$5x-3y+15=0$ and $5x+4y=20$
Also find the area of the region enclosed by these lines and x – axis.

24 Yash scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Yash would have scored 50 marks. How many questions he attempted? 4
Which value would Yash violate if he resorts to unfair means?

25 In an equilateral triangle PQR, the side QR is trisected at S. Prove that $9\,PS^2=7\,PQ^2$ 4

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

27 If $\theta = 60°$, show that : 4

(i) $\sin\theta = \dfrac{\tan\theta}{\sqrt{1+\tan^2\theta}}$

(ii) $\tan\theta = \dfrac{\sqrt{1-\cos^2\theta}}{\cos\theta}$

28 If $m = \cos A - \sin A$ and $n = \cos A + \sin A$, then show that 4

$$\frac{m}{n}-\frac{n}{m}=-\frac{4\sin A\cos A}{\cos^2 A-\sin^2 A}=-\frac{4}{\cot A-\tan A}.$$

29 Prove that : 4

$$\left(\frac{\cos A}{1+\sin A}+\frac{1+\sin A}{\cos A}\right)\cdot\left(\frac{\cos A}{1-\sin A}-\frac{1-\sin A}{\cos A}\right)=4\tan A.\sec A$$

30 Monthly milk consumption of 60 families of a locality is given in the following frequency 4

distribution :

Consumption (in litres)	more than or equal to 15	more than or equal to 20	more than or equal to 25	more than or equal to 30	more than or equal to 35	more than or equal to 40	more than or equal to 45
Number of families	60	55	50	39	24	15	5

Draw a 'more than type' ogive and from this curve find median.

31 The following frequency distribution shows the survey of height of 50 girls and median is given to be 151.5. Find the missing frequencies. 4

Height (in cm)	Number of girls
120 - 130	2
130 - 140	f_1
140 - 150	12
150 - 160	f_2
160 - 170	8

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