PADASALAI CENTUM QUESTIONS 2019-2020

MODEL QUARTERLY EXAMINATION - மாதிரி காலாண்டுத்தேர்வு

10th Standard EM

Maths - A

Reg.No. :

Use Blue or Black pen only

Note : This question paper contains four parts

Time : 02:30:00 Hrs

Total Mark : 100

PART - I (MARKS : 14)

14 x 1 = 14

I. CHOOSE THE MOST SUITABLE ANSWER:

1) $7^{4k} \equiv$ _____ (mod 100)

   (a) 1   (b) 2   (c) 3   (d) 4

2) Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are

   (a) 0, 1, 8   (b) 1, 4, 8   (c) 0, 1, 3   (d) 0, 1, 3

3) The solution of $(2x - 1)^2 = 9$ is equal to

   (a) -1   (b) 2   (c) -1, 2   (d) None of these

4) Find the matrix X if $2X + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

   (a) $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$
   (b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$
   (c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$
   (d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

5) Let $f(x) = \sqrt{1 + x^2}$ then

   (a) $f(xy) = f(x).f(y)$ (b) $f(xy) \geq f(x).f(y)$ (c) $f(xy) \leq f(x).f(y)$ (d) None of these

6) $y^2 + \frac{1}{y^2}$ is not equal to

   (a) $\frac{y^2+1}{y^2}$
   (b) $\left(y + \frac{1}{y}\right)^2$
   (c) $\left(y - \frac{1}{y}\right)^2 + 2$
   (d) $\left(y + \frac{1}{y}\right)^2 - 2$

7) If a letter is chosen at random from the English alphabets {a,b,...,z}, then the probability that the letter chosen precedes x

   (a) $\frac{12}{13}$ (b) $\frac{1}{13}$ (c) $\frac{23}{26}$ (d) $\frac{3}{26}$

8) If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is

   (a) 3.5   (b) 3   (c) 4.5   (d) 2.5

9) A tangent is perpendicular to the radius at the

   (a) centre   (b) point of contact   (c) infinity   (d) chord

10) Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?

    (a) 13 m   (b) 14 m   (c) 15 m   (d) 12.8 m

11) If the ratio of the height of a tower and the length of its shadow is $\sqrt{3}$:1 then the angle of elevation of the sun has measure

    (a) 45°   (b) 30°   (c) 90°   (d) 60°

12) If $(\sin \alpha + \csc \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = k + \tan^2\alpha + \cot^2\alpha$, then the value of k is equal to

    (a) 9   (b) 7   (c) 5   (d) 3

13) Let A={1,2,3,4} and B={4,8,9,10}. A function f: A $\longrightarrow$ B given by f={(1,4), (2,8), (3,9), (4,10)} is a

    (a) Many-one function   (b) Identity function   (c) One-to-one function   (d) Into function

14) If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is

    (a) 0   (b) 6   (c) 7   (d) 13

PART - II (MARKS : 20)

10 x 2 = 20

II. ANSWER **TEN** QUESTIONS. **QUESTION 28 IS COMPULSORY**

15) Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$

16) Find the mean and variance of the first n natural numbers.

17) Show that $\triangle$PST~$\triangle$PQR
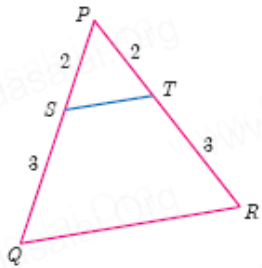
18) Solve $2x - 3y = 6$, $x + y = 1$

19) Reduce the rational expressions to its lowest form

$\frac{x-3}{x^2-9}$

20) Solve $\begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 4 \\ 5 \end{bmatrix}$

21) if $\csc\theta + \cot\theta = p$, then prove that $\cos\theta = \frac{p^2-1}{p^2+1}$

22) Let X={1,2,,4} and Y={2,4,6,8,10} and R={(1,2),(2,4),(3,6),(4,8)} Show that R is a function and find its domain, co-domain and range?

23) If l^{th}, n^{th} and nth terms of an A.P are x, y, z respectively, then show that

x (m -n) + y (n -1) + z (l -m) = 0

24) Find the sum of

1+3+5+..+55

25) Find the area of the triangle whose vertices are (-3,5) , (5,6) and (5,-2)

26) The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

27) Find f o g and g o f when f(x)=2x+1 and g(x)=x^2-2

28) Find the equation of a line which passes through (5, 7) and makes intercepts on the axes equal in magnitude but opposite in sign.

PART - III (MARKS : 50)

10 x 5 = 50

**III.** ANSWER **TEN** QUESTIONS. **QUESTION 42 IS COMPULSORY**

29) How many terms of the series 1 + 4 + 16 + ...make the sum 1365?

30) Let A = {3,4,7,8} and B = {1,7,10}. Which of the following sets are relations from A to B?

(i) R_1={(3,7), (4,7), (7,10), (8,1)}

(ii) R_2= {(3,1), (4,12)}

(iii) R_3= {(3,7), (4,10), (7,7), (7,8), (8,11), (8,7), (8,10)}

31) The following table gives the values of mean and variance of heights and weights of the 10th standard students of a school.

	Height	Weight
Mean	155 cm	46.50 kg^2
Variance	72.25 cm^2	28.09 kg^2

Which is more varying than the other?

32) Solve $2x^2$ - 3x - 3 = 0 by formula method.

33) Show that the points (-2, 5), (6, -1) and (2, 2) are collinear

34) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.

35) Find the GCD of $6x^3 - 30x^2 + 60x - 48$ and $3x^3 - 12x^2 + 21x - 18$.

36) Let f be a function f:N $\longrightarrow$ N be defined by f(x) = 3x+2x $\in$ N

(i) Find the images of 1, 2, 3

(ii) Find the pre-images of 29, 53

(ii) Identify the type of function

37) Find the square root of the following expressions

$(16x^2 + x - 1)(3x^2 + 2x - 1)(2x^2 + 3x + 1)$

38) From a window (h metres high above the ground) of a house in a street, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are θ_1 and θ_2 respectively. Show that the height of the opposite house is h $\left(1 + \frac{cot\theta_2}{cot\theta_1}\right)$

39) A person saved money every year, half as much as he could in the previous year. If he had totally saved Rs.7875 in 6 years then how much did he save in the first year?

40) A tower stands vertically on the ground. from a point on the ground,whivh is 48m away from the foot of the tower, the angel of elevation of the top of the tower is 30°.find the hieght of the tower.

41) In Fig, ABC is a triangle with $\angle B=90^o$, BC=3cm and AB=4 cm. D is point on AC such that AD=1 cm and E is the midpoint of AB. Join D and E and extend DE to meet CB at F. Find BF.
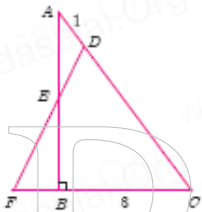
42) Find the slope of a line joining the given points
$\left(-\frac{1}{3}, \frac{1}{2}\right)$ and $\left(\frac{2}{7}, \frac{3}{7}\right)$

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