



Sri Raghavendra Tuition Center

BRIGHT STUDENTS SCRIPT

10th Standard

Maths

Date : 14-12-24

Reg.No. :

Exam Time : 03:00 Hrs

Total Marks : 160

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EACHER NAME: P.DEEPAK M.Sc.,M.A.,B.Ed.,DCA.,TET-1.,TET-2.,

PHONE NUMBER : 9944249262

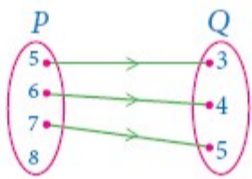
EMAIL: darthi99ktp@gmail.com

Centum Book Available

I. Prepare all question.

108 x 2 = 216

- 1) If $A \times B = \{(3,2), (3, 4), (5,2), (5, 4)\}$ then find A and B.
- 2) Find $A \times B$, $A \times A$ and $B \times A$
 $A = \{2, -2, 3\}$ and $B = \{1, -4\}$
- 3) Let $A = \{1,2,3\}$ and $B = \{x \mid x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$.
- 4) If $B \times A = \{(-2,3), (-2,4), (0,3), (0,4), (3,3), (3,4)\}$ find A and B.
- 5) The arrow diagram shows a relationship between the sets P and Q. Write the relation in
 - (i) Set builder form
 - (ii) Roster form
 - (iii) What is the domain and range of R.



- 6) Let $A = \{1, 2, 3, 4, \dots, 45\}$ and R be the relation defined as "is square of a number" on A. Write R as a subset of $A \times A$. Also, find the domain and range of R.
- 7) A relation $f: X \rightarrow Y$ is defined by $f(x) = x^2 - 2$ where $x \in \{-2, -1, 0, 3\}$ and $Y = \mathbb{R}$
 - (i) List the elements of f
 - (ii) Is f a function?
- 8) Let $f(x) = 2x + 5$. If $x \neq 0$ then find $\frac{f(x+2)-f(2)}{x}$.
- 9) A function f is defined by $f(x) = 3 - 2x$. Find x such that $f(x^2) = (f(x))^2$.
- 10) Find $f \circ g$ and $g \circ f$ when $f(x) = 2x + 1$ and $g(x) = x^2 - 2$
- 11) Represent the function $f(x) = \sqrt{2x^2 - 5x + 3}$ as a composition of two functions.
- 12) If $f(x) = 3x - 2$, $g(x) = 2x + k$ and if $f \circ g = f \circ f$, then find the value of k..
- 13) Find k if $f \circ f(k) = 5$ where $f(k) = 2k - 1$.
- 14) If $f(x) = x^2 - 1$, $g(x) = x - 2$ find a, if $g \circ f(a) = 1$
- 15) If $f(x) = x^2 - 1$. Find
 - i. $f \circ f$
 - ii. $f \circ f \circ f$
- 16) Find $A \times B$, $A \times A$ and $B \times A$
 $A = B = \{p, q\}$

- 17) Find $A \times B$, $A \times A$ and $B \times A$
 $A = \{m, n\}; B = \phi$
- 18) 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'
- 19) For what values of natural number n , 4^n can end with the digit 6?
- 20) If $13824 = 2^a \times 3^b$ then find a and b .
- 21) The general term of a sequence is defined as

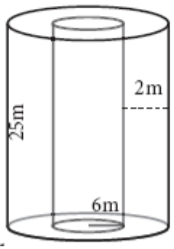
$$a_n = \begin{cases} n(n+3); n \in N \text{ is odd} \\ n^2 + 1; n \in N \text{ is even} \end{cases}$$
 Find the eleventh and eighteenth terms.
- 22) Which term of an A.P. 16, 11, 6, 1, ... is -54?
- 23) If $3 + k$, $18 - k$, $5k + 1$ are in A.P. then find k .
- 24) Find x , y and z , given that the numbers x , 10, y , 24, z are in A.P.
- 25) Find the 8th term of the G.P 9, 3, 1, ...
- 26) Find the number of terms in the following G.P.
 4, 8, 16, ..., 8192
- 27) If $A = \begin{bmatrix} 5 & 4 & 3 \\ 1 & -7 & 9 \\ 3 & 8 & 2 \end{bmatrix}$ then find the transpose of A .
- 28) If $A = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$ then find the transpose of $-A$.
- 29) If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $(A^T)^T = A$
- 30) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 7 & 0 \\ 1 & 3 & 1 \\ 2 & 4 & 0 \end{bmatrix}$, find $A + B$.
- 31) If $A = \begin{bmatrix} 1 & 3 & -2 \\ 5 & -4 & 6 \\ -3 & 2 & 9 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 8 \\ 3 & 4 \\ 9 & 6 \end{bmatrix}$, find $A + B$.
- 32) If $A = \begin{bmatrix} 7 & 8 & 6 \\ 1 & 3 & 9 \\ -4 & 3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 11 & -3 \\ -1 & 2 & 4 \\ 7 & 5 & 0 \end{bmatrix}$ then Find $2A + B$.
- 33) If $A = \begin{bmatrix} 5 & 4 & -2 \\ \frac{1}{2} & \frac{3}{4} & \sqrt{2} \\ 1 & 9 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -7 & 4 & -3 \\ \frac{1}{4} & \frac{7}{2} & 3 \\ 5 & -6 & 9 \end{bmatrix}$, find $4A - 3B$.
- 34) Find the values of x , y and z from the following equations.

$$\begin{bmatrix} x+y & 2 \\ 5+x & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$
- 35) Find the values of x , y and z from the following equations.

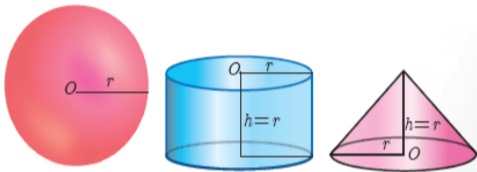
$$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$
- 36) Determine the entries denoted by a_{11} , a_{22} , a_{33} , a_{44} from the matrix

$$\begin{bmatrix} 2 & 1 & 3 & 4 \\ 5 & 9 & -4 & \sqrt{7} \\ 3 & 5/2 & 8 & 9 \\ 7 & 0 & 1 & 4 \end{bmatrix}$$
- 37) A cylindrical drum has a height of 20 cm and base radius of 14 cm. Find its curved surface area and the total surface area.
- 38) The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2 . Find the diameter of the cylinder.

- 39) A garden roller whose length is 3 m long and whose diameter is 2.8 m is rolled to level a garden. How much area will it cover in 8 revolutions?
- 40) If one litre of paint covers 10 m^2 , how many litres of paint is required to paint the internal and external surface areas of a cylindrical tunnel whose thickness is 2 m, internal radius is 6 m and height is 25 m.



- 41) The radius of a conical tent is 7 m and the height is 24 m. Calculate the length of the canvas used to make the tent if the width of the rectangular canvas is 4 m?
- 42) If the total surface area of a cone of radius 7cm is 704 cm^2 , then find its slant height.
- 43) Find the diameter of a sphere whose surface area is 154 m^2 .
- 44) The radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.
- 45) If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area?
- 46) A sphere, a cylinder and a cone are of the same radius, where as cone and cylinder are of same height. Find the ratio of their curved surface areas.



- 47) The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area.
- 48) The external radius and the length of a hollow wooden log are 16 cm and 13 cm respectively. If its thickness is 4 cm then find its T.S.A.
- 49) 4 persons live in a conical tent whose slant height is 19 cm. If each person require 22 cm^2 of the floor area, then find the height of the tent.
- 50) The radius of a sphere increases by 25%. Find the percentage increase in its surface area.
- 51) Find the volume of a cylinder whose height is 2 m and whose base area is 250 m^2 .
- 52) The volume of a solid right circular cone is 11088 cm^3 . If its height is 24 cm then find the radius of the cone.
- 53) The ratio of the volumes of two cones is 2 : 3. Find the ratio of their radii if the height of second cone is double the height of the first.
- 54) A 14 m deep well with inner diameter 10 m is dug and the earth taken out is evenly spread all around the well to form an embankment of width 5 m. Find the height of the embankment.
- 55) If the circumference of a conical wooden piece is 484 cm then find its volume when its height is 105 cm.
- 56) Water is flowing at the rate of 15 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tanks will rise by 21 cm.
- 57) Find the range and coefficient of range of the following data: 25, 67, 48, 53, 18, 39, 44.
- 58) Find the range of the following distribution..
- | | | | | | | |
|--------------------|-------|-------|-------|-------|-------|-------|
| Age (in years) | 16-18 | 18-20 | 20-22 | 22-24 | 24-26 | 26-28 |
| Number of students | 0 | 4 | 6 | 8 | 2 | 2 |
- 59) The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.
- 60) Find the range and coefficient of range of the following data. 63, 89, 98, 125, 79, 108, 117, 68
- 61) If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.

- 62) Calculate the range of the following data..

Income	400-450	450-500	500-550	550-600	600-650
Number of workers	8	12	30	21	6

- 63) Find the standard deviation of first 21 natural numbers.
- 64) If the standard deviation of a data is 4.5 and if each value of the data is decreased by 5, then find the new standard deviation.
- 65) If the standard deviation of a data is 3.6 and each value of the data is divided by 3, then find the new variance and new standard deviation.
- 66) The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation.
- 67) 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
Variance	72.25 cm ²	28.09 kg

Which is more varying than the other?

- 68) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
- 69) Two coins are tossed together. What is the probability of getting different faces on the coins?
- 70) What is the probability that a leap year selected at random will contain 53 Saturdays. (Hint: $366 = 52 \times 7 + 2$)
- 71) A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and the coin shows a head.
- 72) Write the sample space for selecting two balls from a bag containing 6 balls numbered 1 to 6 (using tree diagram).
- 73) A coin is tossed thrice. What is the probability of getting two consecutive tails?
- 74) A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is almost 0.8.
- 75) If $P(A) = \frac{2}{3}$, $P(B) = \frac{2}{5}$, $P(A \cup B) = \frac{1}{3}$ then find $P(A \cap B)$.
- 76) A and B are two events such that, $P(A) = 0.42$, $P(B) = 0.48$, $P(A \cap B) = 0.16$. Find (i) $P(\text{not } A)$ (ii) $P(\text{not } B)$ (iii) $P(A \text{ or } B)$
- 77) If A and B are two mutually exclusive events of a random experiment and $P(\text{not } A) = 0.45$, $P(A \cup B) = 0.65$, then find $P(B)$.
- 78) The probability that atleast one of A and B occur is 0.6. If A and B occur simultaneously with probability 0.2, then find $P(\bar{A}) + P(\bar{B})$.
- 79) The probability of happening of an event A is 0.5 and that of B is 0.3. If A and B are mutually exclusive events, then find the probability that neither A nor B happen.
- 80) If $f(x) = x^m$ and $g(x) = x^n$ does $f \circ g = g \circ f$?
- 81) If $A = \{1,3,5\}$ and $B = \{2,3\}$ then
 (i) find $A \times B$ and $B \times A$
 (ii) Is $A \times B = B \times A$? If not why?
 (iii) Show that $n(A \times B) = n(B \times A) = n(A) \times n(B)$
- 82) If $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ prove that $AA^T = I$.
- 83) Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$
- 84) If $A = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 1 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 8 & 3 & 1 \\ 2 & 4 & 1 \\ 5 & 3 & 1 \end{bmatrix}$, find AB .
- 85) If a matrix has 16 elements, what are the possible orders it can have?
- 86) Construct a 3 x 3 matrix whose elements are $a_{ij} = i^2j^2$
- 87) Find the value of a, b, c, d from the equation $\begin{pmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{pmatrix} = \begin{pmatrix} 1 & 5 \\ 0 & 2 \end{pmatrix}$

- 88) Find the values of x, y and z from the following equations

$$\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$$
- 89) Find the value of a, b, c, d, from the following matrix equation.

$$\begin{bmatrix} d & 8 \\ 3b & a \end{bmatrix} + \begin{bmatrix} 3 & a \\ -2 & -4 \end{bmatrix} = \begin{bmatrix} 2 & 2a \\ b & 4c \end{bmatrix} + \begin{bmatrix} 0 & 1 \\ -5 & 0 \end{bmatrix}$$
- 90) Find the value of the radius of a sphere whose surface area is 36π sq. units
- 91) T.S.A of a hemisphere is equal to how many times the area of its base?
- 92) If the ratio of radii of two spheres is 4 : 7, find the ratio of their volumes.
- 93) The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation.
- 94) The standard deviation and coefficient of variation of a data are 1.2 and 25.6 respectively. Find the value of mean.
- 95) If the mean and coefficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation.
- 96) If $P(A) = 0.37$, $P(B) = 0.42$, $P(A \cap B) = 0.09$ then find $P(A \cup B)$.
- 97) prove that $1 + \frac{\cot^2 \theta}{1 + \operatorname{cosec} \theta} = \operatorname{cosec} \theta$
- 98) prove the following identity $\tan^4 \theta + \tan^2 \theta = \sec^4 \theta - \sec^2 \theta$.
- 99) prove the following identity.

$$\frac{\cos \theta}{1 + \sin \theta} = \sec \theta - \tan \theta$$
- 100) prove that $\sec \theta - \cos \theta = \tan \theta \sin \theta$
- 101) prove the following identities

$$\sqrt{\frac{1 + \sin \theta}{1 - \sin \theta}} + \sqrt{\frac{1 + \sin \theta}{1 - \sin \theta}} = 2 \sec \theta$$
- 102) prove that $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \operatorname{cosec} \theta + \cot \theta$
- 103) Prove that $\tan^2 \theta - \sin^2 \theta = \tan^2 \theta \sin^2 \theta$
- 104) prove the following identities. $\frac{1 - \tan^2 \theta}{\cot^2 \theta - 1} = \tan^2 \theta$
- 105) prove the following identity.

$$\sqrt{\frac{1 + \sin \theta}{1 - \sin \theta}} = \sec \theta + \tan \theta$$
- 106) prove that $\frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$
- 107) Show that the points (-2, 5), (6, -1) and (2, 2) are collinear
- 108) Find the area of the triangle formed by the points :(-10, -4), (-8, -1) and (-3, -5)
