MATHS

BOOKS - SURA MATHS (TAMIL ENGLISH)

GOVT. MODEL QUESTION PAPER-2019-20

Part I

1. If $n(A \times B) = 6$ and $A = \{1, 3\}$, then $n(B)$ is

A. 1

B. 2

C. 3

D. 6

Answer: C

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2. Given

$$F_1 = 1, F_2 = 3 \text{ and } F_n = F_{n-1} + F_{n-2}$$

then F_5 is

A. 3

B. 5

C. 8

D. 11

Answer: D

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3. In an A.P., the first terms is 1 and the the common difference is 4. How many terms of the A.P. must be taken for their sum to be equal to 120?

A. 6

B. 7

C. 8

D. 11

Answer: C

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4. $f = \{(2, 1), (3, b), (4, b), (5, c)\}$ is a____.

A. identity function

B. one-one function

C. many-one functions

D. constant function

Answer: C

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5. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis.

A. 0

B. 1

C. 0 or 1

D. 2

Answer: B

6. The no-diagonal elements is any unit matrix are ___.

A. 0

B. 1

C. m

D. n

Answer: A

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7. If A is a 2×3 matrix and B is 3×4 matrix, how many columns does AB have

A. 3

B. 4

C. 2

D. 5

Answer: B

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8. In figure CP and CQ are tangents to a circle with centre at O. ARB is another tangent touching the circle at R. If CP=11 cm and BC=7 cm, then the length of BR is

A. 6 cm

B. 5 cm

C. 8 cm

D. 4 cm

Answer: D

9. The slope of the line joining $(12, 3)$, $(4, a)$ is $\dfrac{1}{8}$. The value of 'a' is

A. 1

B. 4

C. -5

D. 2

Answer: D

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10. If $x = a \tan \theta$ and $y = b \sec \theta$ then

A. $\dfrac{y^2}{b^2} - \dfrac{x^2}{a^2} = 1$

B. $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$

C. $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$

D. $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 0$

Answer: A

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11. A letter is chosen at random from the letter of the word "PROBABILITY". Find the probability that is not a vowel.

A. $\dfrac{1}{5}$

B. $\dfrac{2}{5}$

C. $\dfrac{1}{3}$

D. $\dfrac{3}{5}$

Answer: B

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12. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be

A. 12 cm

B. 10 cm

C. 13 cm

D. 5 cm

Answer: A

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13. 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

Answer: A

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14. Variance of first 20 natural numbers is

A. 32.25

B. 44.25

C. 33.25

D. 30

Answer: C

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Part Ii

1. Define a function.

2. Compute x scuh that $10^4 = x \pmod{19}$.

3. Simplify

$$\frac{4x^2 y}{2z^2} \times \frac{6xz^3}{20y^4}$$

4. Peri needs 4 hours to complete a work. His friend Yuvan needs 6 hours to complete the same work. How long will take to complete if they work together?

5. Find the values of x, y, and z from the following equations

$$\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$$

6. What length of ladder is needed to reach a height of 7 ft along the wall when the base of the ladder is 4 ft from the wall ?

7. Prove that : $\sqrt{\dfrac{1 + \cos\theta}{1 - \cos\theta}} = \cos ec\theta + \cot\theta.$

8. The radius of a sphere increases by 25% . Find the percentage increase in its surface area.

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9. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation.

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10. If $f(x) = 3 + x$, $g(x) = x - 4$, then check whether fog=gof.

11. An organization plans to plant saplings is 25 streets in a town in such a way that one sapling for the first street, three for the seconds, nine for the third and so on. How many sapling are needed to complete the work?

12. Find the 9th term of A.P. $-11, \; -15, \; -19, \ldots$

13. Find the value of $\angle BAC$ in the given triangle .

14. The vertices of a triangle are $A(-1, 3)$, $B(1, -1)$ and $C(5, 1)$. Find the length of the median through the vertex C.

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Part lii

1. Let f be function $f: N \rightarrow N$ be defined by $f(x) = 3x + 2, \xi nN$.

Find the images of 1, 2, 3

2. Let f be function $f : N \rightarrow N$ be defined by

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Find the images of 1, 2, 3

3. Let f be a function of $f : N \rightarrow N$ be defined

by $f(x) = 3x + 2$, x in N`.

Find the image of 1, 2, 5.

Identity the type of function.

4. Let: $f : A \to B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A={2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

set of ordered pairs,

5. Let: $f : A \to B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A={2, 4, 6, 10, 12}, B={0,

1, 2, 4, 5, 9}. Represents f by

a table,

6. Let: $f: A \rightarrow B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A={2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

an arrow diagram diagram,

7. Let: $f: A \to B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A={2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

a graph,

8. The ratio of 6th and 8th term of an A.P. is 7.9.

Find the ratio of 9th to 13th term.

9. The sum of first n, 2n and 3n terms of an A.P. are S_1, S_2, S_3 respectively. Prove that $S_3 = 3(S_2 - S_1)$.

10. Find the values of m and n if the following expression are perfect squares.

$$\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$$

11. If α, β are the roots of the equation $2x^2 - x - 1 = 0$ then form the equation whose roots are $\alpha^2\beta$?

12. P and Q are the mid-points of the sides CA and CB respectively of a $\triangle ABC$, right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$.

13. Find the equation of a straight line

Passing through (1, -4) and has intercepts

which are in the ratio 2:5

14. From the top of the tower 60 m high the

angles of depression of the top and bottom of

a vertical lamp post are observed to be

$38°$ and $60°$ respectively. Find the height of

the   lamp   post.

$$\left(\tan 38° = 0.7813, \sqrt{3} = 1.732\right)$$

15. Calculate the weight of a hallow brass sphere if the inner diameter is 14 xm and thickness is 1mm, and whose density if $17\frac{g}{7}cm^3$.

16. Find the coefficient of variation of 24,26,33,37,29,31.

17. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is

8

18. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is

13

19. Two dice, one blue and one grey, are thrown at the same time. Write down all the possible outcomes. What is the probability that the sum of the two numbers appearing on the top of the dice is

less than or equal to 12

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Part Iv

1. Find two consecutive positive integers, sum of whose squares is 365.

2. A cylinderical bucket of 32 cm high and with radius of base 18 cm, is filled with sand completely. This bucket is e4mptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

3. PQ is a chord of length 8 cm to a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length of the tangent TP.

4. Draw a triangle ABC of base BC=8 cm, $\angle A = 60°$ and the bisector of $\angle A$ meets BC at D such that $BD = 6cm$.

5. Draw the graph $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$.

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6. A motor boat whose speed is 18km/hr in still water takes 1hour more to go 24km upstream than to the return downstream to the same spot. Find the speed of the stream.

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