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NAMAKKAL (DT)

SECOND MID TERM TEST, NOVEMBER - 2019
STANDARD - X

Time : 1.15 hrs

MATHS

Marks: 50

Part - I

I. Choose the correct answer:-

7×1=7

- 1) If order of the matrix A is 2×3 and order of matrix B is 3×4 then order of BA is
 a) 2×4 b) 4×2 c) 3×3 d) Not defined
- 2) The transpose of column matrix is
 a) column matrix b) unit matrix c) row matrix d) diagonal matrix
- 3) A tangent is perpendicular to the radius at
 a) centre b) infinity c) point of contact d) chord
- 4) If the ratio between height of a tower and its shadow is $\sqrt{3}:1$ then the angle of elevation of the sun is
 a) 45° b) 30° c) 90° d) 60°
- 5) If $x = a \sin \theta$, $y = a \cos \theta$ then the value of $x^2 + y^2 =$
 a) a b) a^2 c) 1 d) $a \sin^2 \theta + a \cos^2 \theta$
- 6) The radius and slant height of a right circular cone is 5cm and 13cm respectively its height is
 a) 12cm b) 10cm c) 13cm d) 5cm
- 7) The ratio of the volume of a cylinder, a cone, and a sphere if each has the same diameter and same height is
 a) 1:2:3 b) 2:1:3 c) 1:3:2 d) 3:1:2

II. Answer any 5 questions. Q.No.14 is compulsory:-

5×2=10

- 8) The roots of the quadratic equation $9x^2 - 24x + k = 0$ are real and equal then find the value of K.
- 9) $A = \begin{pmatrix} 2 & 5 \\ 4 & 3 \end{pmatrix}$ $B = \begin{pmatrix} 1 & -3 \\ 2 & 5 \end{pmatrix}$ find AB and BA also check are they equal
- 10) A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point.
- 11) A player sitting on the top of a tower of height 20m observes the angle of depression of ball lying on the ground as 60° . Find the distance between tower and ball. ($\sqrt{3} = 1.732$)

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2 X- Maths

- 12) If the slant height of frustum of a right circular cone is 5cm and the two radii are 4cm and 1cm then find the curved surface area of frustum of cone.
- 13) If the ratio of radii of two spheres is 4:7 then find the ratio of their volumes.
- 14) If α and β are the root of the polynomial $f(x)=x^2-2x+3$ then find the polynomial whose ratio are $\alpha+2$, $\beta+2$

III. Answer any 5 questions. Q.No.21 is compulsory:-

5×5=25

- 15) A bus covers a distance of 90km at a uniform speed. Had the speed been 15km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

16) If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$

- 17) State and prove pythagoras theorem.
- 18) A man is standing on the deck of a ship which is 40m above the water level. He observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and height of the hill. ($\sqrt{3}=1.732$)
- 19) A girl wishes to prepare birthday caps in the form of right circular cone for her birthday party using a sheet of paper whose area is 5720 cm^2 . How many caps can be made with radius 5cm and height 12cm.
- 20) A solid sphere of radius 6cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of cylinder is 5cm and its height is 32cm then find the thickness of the cylinder.
- 21) Two ships are sailing in the sea on either side of the lighthouse. The angle of depression of two ships as observed from the top of the lighthouse are 60° and 45° respectively. If the distance between the ships is $200 \left(\frac{\sqrt{3}+1}{\sqrt{3}} \right)$ metres. Find the height of the lighthouse.

IV. Answer any one:-

1×8=8

- 22) Draw a circle of radius 4.5cm. Take a point on the circle. Draw the tangent at that point using the alternate segment theorem.
- 23) Draw the two tangent from a point which is 5cm away from centre of circle of diameter 6cm. Also measure the length of the tangent.



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SECOND MIDTERM EXAMINATION, NOVEMBER - 2019-2020

SSLC - MATHEMATICS
TENTATIVE ANSWER KEY

MARKS: 50

PART - I (Marks: 7)

I. Choose the correct answers:			7 x 1 = 7
Q. No.	Option	Answer	
1	d	Not defined	
2	c	row matrix	
3	c	Point of contact	
4	d	60°	
5	b	a^2	
6	a	12cm	
7	d	3:1:2	

PART - II [MARKS : 10]

II. Answer 5 Questions. Question No : 14 is compulsory		5 x 2 = 10	
8	$b^2 - 4ac = 0 \Rightarrow (-24)^2 - 4(9)(k) = 0$ $k = 16$	1 1	2 Marks
9	$AB = \begin{pmatrix} 12 & 19 \\ 10 & 3 \end{pmatrix}$ $BA = \begin{pmatrix} -10 & -4 \\ 24 & 23 \end{pmatrix}$ $AB \neq BA$	1 1	2 Marks

10	$AC^2 = AB^2 + BC^2 = 18^2 + 24^2$ Required distance is 30m	1 1	2 Marks
11	$\tan 60^\circ = \frac{20}{x}$ Required distance is 11.55m	1 1	2 Marks
12	$CSA = \pi(R+r)l$ sq.units (OR) $= \frac{22}{7} \times (4+1) \times 5$ $CSA = 78.57cm^2$	1 1	2 Marks
13	$V_1 : V_2 = \frac{4}{3}\pi r_1^3 : \frac{4}{3}\pi r_2^3 \Rightarrow 4^3 : 7^3$ Required ratio is 64:343	1 1	2 Marks
14	$\alpha + \beta = 2 ; \alpha\beta = 3$ Sum = 6 ; Product = 11 Required polynomial is $P(x) = x^2 - 6x + 11$	1 1	2 Marks

PART – III [MARKS : 25]

III. Answer 5 Questions. Question No : 21 is compulsory.		5 x 5 = 25	
15	$T_1 = \frac{90}{x} ; T_2 = \frac{90}{x+15}$ $T_1 - T_2 = \frac{1}{2}$ (or) $\frac{90}{x} - \frac{90}{x+15} = \frac{1}{2}$ $x^2 + 15x - 2700 = 0$ $(x+60)(x-45) = 0$ Required speed is 45 km/hr	1 1 1 1 1	5 Marks

16	$AB = \begin{pmatrix} 52 & 30 \\ 43 & 3 \end{pmatrix}; (AB)^T = \begin{pmatrix} 52 & 43 \\ 30 & 3 \end{pmatrix}$ $B^T = \begin{pmatrix} 1 & 1 & 5 \\ 7 & 2 & -1 \end{pmatrix}; A^T = \begin{pmatrix} 5 & 1 \\ 2 & 2 \\ 9 & 8 \end{pmatrix}$ $B^T A^T = \begin{pmatrix} 52 & 43 \\ 30 & 3 \end{pmatrix}$	2 2 1	5 Marks
17	<p>Statement Diagram Given, To prove and Construction Proof Note : Without diagram give 1 mark only for statement</p>	1 1 1 2	5 Marks
18	<p>Diagram</p> $\tan 30^\circ = \frac{40}{x} \Rightarrow x = 40\sqrt{3}$ $\tan 60^\circ = \frac{h-40}{x} \Rightarrow x = \frac{h-40}{\sqrt{3}}$ <p>Required height is $h = 160 \text{ m}$ Required distance is $x = 69.28 \text{ m}$</p>	1 1 1 1 1	5 Marks
19	<p>Slant height $l = \sqrt{h^2 + r^2} = \sqrt{12^2 + 5^2} = 13 \text{ cm}$ CSA = $\pi r l$ sq.units = $\frac{22}{7} \times 5 \times 13 = \frac{1430}{7}$ Required number of caps = $\frac{5720}{1430/7} = 28$</p>	2 2 1	5 Marks
20	$\pi(R^2 - r_1^2)h = \frac{4}{3}\pi r^3$ $(25 - r_1^2)32 = \frac{4}{3} \times 216$ $r_1 = 4$ <p>Required thickness is 1 cm</p>	2 2 1	5 Marks

21	Diagram	1	5 Marks
	$\tan 60^\circ = \frac{h}{AD} \Rightarrow AD = \frac{h}{\sqrt{3}}$	1	
	$\tan 45^\circ = \frac{h}{DB} \Rightarrow DB = h$	1	
	Distance between two ships $AD + DB = \frac{200(\sqrt{3}+1)}{\sqrt{3}}$	1	
	$\frac{h}{\sqrt{3}} + h = \frac{200(\sqrt{3}+1)}{\sqrt{3}}$ Required height is $h = 200$ m	1	

PART – IV [MARKS : 8]

IV. Answer any one		1 x 8 = 8	
22	Rough Diagram	2	8 Marks
	Construct a circle	2	
	Construct a Triangle	2	
	Construct a Tangent	2	
23	Rough Diagram	1	8 Marks
	First circle	1	
	Line segment OP	1	
	Perpendicular bisector	1	
	Second circle	2	
	Two tangent lines	1	
	Measuring the tangents length = 4 cm	1	

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