Padasalai '. Net Centum Special Coaching Team -Pre Half –Yearly 2018

STD : X1 MATHEMATICS

Time allowed : 2 hours 30 minutes Maximum Marks : 90 marks

Instructions : (1) Check the question paper for fairness of printing . If there is any lack of fairness , inform the hall supervisor immediately.
(2) Use Blue or Black ink to write and pencil to draw diagrams .

Section – A $20 \times 1 = 20$

Note : (i) Answer all the questions
(ii) Choose the most suitable answer from the given four alternatives and write the option Code and corresponding answer.

1.If A={(x,y) : y=e^x , xϵR } and B={(x,y) : y=e^{-x} , xϵR } then n(A∩ B) is
(1) infinity (2) 0 (3) 1 (4) 2

2.In a regular hexagon ABCDEF , $\overrightarrow{AB} = a$, $\overrightarrow{BC} = b$ and $\overrightarrow{CD} = c$. Then $\overrightarrow{AE} =$
(1) $\vec{a} + \vec{b} + \vec{c}$ (2) $\overrightarrow{2a} + \vec{b} + \vec{c}$ (3) $\vec{b} + \vec{c}$ (4) $\vec{a} + 2\vec{b} + \overrightarrow{2c}$

3. The solution set of the following inequality $|x-1| \geq |x-3|$ is
(1) [0,2] (2) [2 , ∞) (3) (0 ,2) (4) ($-\infty$, 2)

4. In a Δ ABC , if
(i) $sin\frac{A}{2}\sin\frac{B}{2}sin\frac{C}{2} > 0$ (ii) $sinAsinBsinC > 0$ then
(1) Both (i) and (ii) are true (2) only (i) is true (3) only (ii) is true (4) Neither (i) nor (ii) is true

5.In 3 fingers , the number of ways four rings can be worn is ……ways
(1) $4^3 - 1$ (2) 3^4 (3) 68 (4) 64

6.The HM of two positive numbers whose AM and GM are 16 ,8 respectively is
(1) 10 (2) 6 (3) 5 (4) 4

7. If $\vec{a}$ and $\vec{b}$ having same magnitude and angle between them is 60° and their scalar product is ½ then $|\vec{a}|$ is (1) 2 (2) 3 (3) 7 (4) 1

8. The value of x , for which the matrix A = $\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular is
(1) 9 (2) 8 (3) 7 (4)

9. The intercepts of the perpendicular bisector of the line segment joining (1 ,2) and (3, 4) with coordinate axes are (1) 5 , -5 (2) 5 , 5 (3) 5 , 3 (4) 5 , -4

10 . Let a function f be defined by $f(x) = \frac{x-|x|}{x}$ $for\ x \neq 0\ and\ f(0) = 2$ then f is
(1) Continuous nowhere (2) continuous everywhere (3) continuous for all except x=1
(4) continuous for all x except x=0

11.If $|\vec{a}|$= 3 , $|\vec{b}|$ =4 , then the value of λ for which $\vec{a} + \lambda\vec{b}$ is perpendicular to $\vec{a} - \lambda\vec{b}$is
(1) 9/16 (2) 3/4 (3) 3/2 (4) 4/3

12. If log (x+y) =2xy then y' (0) is (1) 1 (2) - 1 (3) 2 (4) 0

13. The number of points in R in which the function $f(x) = |x-1| + |x-3| + sinx$ is not differentiable, is ….(1) 3 (2) 2 (3) 1 (4) 4

14. If $+\beta = \frac{\pi}{4}$, then the value of $(1 + tan\alpha)(1 + tan\beta)$ is
(1) 1 (2) 2 (3) -2 (4) not defined

15. A line cutting off intercept -3 from the y –axis and the tangent at angle to the x- axis is 3/5 , its equation is (1) 5y-3x+15=0 (2) 3y-5x+15=0 (3) 5y -3x-15=0 (4) none of the above

16. The number of 5- digit telephone numbers having atleast one of their digits repeated is
(1) 90000 (2) 10000 (3) 30240 (4) 69760

17. If t_n denotes the nth term of the series 2+3+6+11+18+……, then t_{50} is
(1) $49^2 - 1$ (2) 49^2 (3) 50^2 -1 (4) 49^2 -1

18. If $= \frac{\sin(x+9)}{\cos x}$, then dy/dx at x=0 is equal to (1) cos 9 (2) sin 9 (3) 0 (4) 1

19.If A= $\{\phi, \{\phi\}\}$ then the power set of A is (1) A (2) $\{\phi, \{\phi\}, A\}$ (3) $\{\phi, \{\phi\}, \{\{\phi\}\}, A\}$ (4) none

20. The value of $\log_3 11.\log_{11} 13.\log_{13} 15.\log_{15} 27.\log_{27} 81$ is
(1) 1 (2) 2 (3) 3 (4) 4

Section - B

Note: Answer any seven questions in which the question number 30 is compulsory 7 × 2 = 14

21. Show that the relation xy= -2 is a function for a suitable domain. Find the domain and the range of the function.
22. Solve $2|x+1| - 6 \leq 7$ and graph the solution set in a number line.
23. Find the length of an arc of a circle of radius 5 cm subtending a central angle measuring 15°
24. In how many ways 5 boys and 4 girls can be seated in a row so that no two girls are together.
25. Find the last two digits of the number 7^{400}
26. Find the projection of $\overrightarrow{AB}$ and $\overrightarrow{CD}$ where A , B ,C , D are the points (4 , - 3 ,0) , (7 ,-5 , -1) , (-2 ,1 ,3) , (0, 2 ,5).
27. Find the slopes of the tangent lines to the graph of $x^2 + y^2 = 4$ at the points corresponding to x =1.
28 The minute hand of a watch is 35 cm long . How far does its tip move in 18 minutes ?
29. Show that $\begin{vmatrix} \sin 10° & -\cos 10° \\ \sin 80° & \cos 80° \end{vmatrix} = 1$
30. Show that the function $f(x) = 2x - |x|$ is continuous at x =0 .

Section –C

Answer any seven questions in which the question number 40 is compulsory 7× 3 =21

31. Find the largest possible domain for the real valued function given by $(x) = \frac{\sqrt{9-x^2}}{\sqrt{x^2-1}}$.
32. Construct a cubic polynomial function having zeros at x = 2/5 , $1 + \sqrt{3}$ such that $f(0) = -8$
33. Solve $3cos^2\emptyset = sin^2\emptyset$
34. Find the number of ways of arranging the letters of the word RAMANUJAN so that the relative positions of vowels and consonants are not changed.
35. When the ninth term of an AP is divided by its second term we get 5 as the quotient , when the thirteenth term is divided by sixth term the quotient is 2 and the remainder is 2. Then find the second term .
36. Find the locus of a point whose coordinate are given by $= t + t^2$, $y = 2t + 1$, where t is variable.
37. Find the relation between a and b if $\lim_{x\to 3} f(x)$ exists where $\begin{cases} ax + b & if\ x > 3 \\ 3ax - 4b + 1 & if\ x < 3 \end{cases}$.
38. The AM of two numbers exceeds their GM by 10 and HM by 16 . Find the numbers
39. If a , b ,c are all positive , and are pth,qth , rth of a G.P ., show that $\begin{vmatrix} loga & p & 1 \\ logb & q & 1 \\ logc & r & 1 \end{vmatrix} = 0$
40. If $x^2 + 2xy + y^2 = 42$ then find dy/dx.

Section –D

Answer all the questions 7 ×5 =35

41. If $\begin{vmatrix} a & b & a\alpha + b \\ b & c & b\alpha + c \\ a\alpha + b & b\alpha + c & 0 \end{vmatrix} = o$,prove that a .b , c are in G.P. or α is a root of $ax^2 + 2bx + c = 0$.

(Or)

In the set Z of integers , define mRm if m-n is divisible by 7. Prove that R is an equivalence relation.

42. Use the method of undetermined coefficients to find the sum of
$1 + 2 + 3 + \cdots + (n-1) + n, n \in N$

(Or)

Find the value of $\tan 7\frac{1^\circ}{2}$

43. Sove the following in equation : $\frac{2x+4}{x-1} \geq 5$

(or) If $= e^{tan^{-1}x}$, show that $(1 + x^2)y'' + (2x - 1)y' = 0$.

44. For what value of α is this function $f(x) = \begin{cases} \frac{x^4-1}{x-1} & if\ x \neq 1 \\ \alpha & if\ x = 1 \end{cases}$ continuous at x = 1

(or)

A quadrilateral is a parallelogram if and if only if its diagonals bisect each other.

45. A man starts his morning walk at a point A reaches two points B and C and finally back to A such that $\angle A = 60^\circ$ and $\angle B = 45^\circ$, AC= 4 km in the triangle ABC. Find the total distance he covered during his morning walk.

(or)

Find the numbers of 5 letters can be found with the letters of the word PROPOSITION.

46. Show that the straight lines $x^2 - 4xy + y^2 = 0$ and $x + y = 3$ form an equilateral triangle.

(Or)

The number of bacteria in a certain culture doubles every hour. If there were 30 bacteria present in the culture originally , how many bacteria will be present at the end of 2nd hour , 4th hour, $and\ nth\ hour$?

47. Using Heron' s formula , show that the equilateral triangle has the maximum area for any fixed perimeter. [Hint: $z \leq k$, maximum occurs when $x = y = z$].

(or)

Show that the function $f(x) = |\sin x + cos\ x|$ is continuous at $x = \pi$.

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ALL THE BEST

M.ARUL SELVAN .,M.Sc.,B.Ed.,PGDCA.,
PG ASSISTANT IN MATHEMATICS
SRGDS MAT HR SEC SCHOOL , TIRUVANNAMALAI
ADDRESS: Mr. M.ARUL SELVAN , M.Sc.,B.Ed.,PGDCA.,
PG –ASSISTANT IN MATHEMATICS ,NO 1331 E , KRISHNA NAGAR,
AVALURPET ROAD,TIRUVANNAMALAI ,
TIRUVANNAMLAI DISTRICT -606601,TAMIL NADU
PH:9965937880 ,9566975880 ,Email : slvnrl27@gmail.com