

## VVR COACHING CENTER

CLASS - XII

MATHS

- CHAPTER

7, 12

MARK - 90

20x1 = 20

I. CHOOSE THE CORRECT ANSWER

PART-B

(WRITE

ANY 7

QUESTION

7x2 = 14

Q. NO

30 IS

COMPULSORY)

21. A person learnt 100 words English each day. The no. of words learnt (remembers)  $w(t) = 100 \times (1 - 0.1t)^2$   $0 \leq t \leq 10$ . What is the rate at which he gets new words 2 days after learning.
22. A thermometer was taken frozen it took 22 degrees scale  $-10^\circ\text{C}$  to  $100^\circ\text{C}$ . Show that rate of change of temperature at some time  $t$  is  $5^\circ\text{C}$  per second.
23. Prove that  $f(x) = x^2 - 2x - 3$  is strictly increasing  $(2, \infty)$ .
24. Find two possible numbers whose product is 20. Sum is minimum.
25. Find smallest possible value  $x^2 + y^2$  given that  $x + y = 10$ .
26. Show that  $P \rightarrow Q \neq Q \rightarrow P$  not equivalent.
27. Show that  $x^2 - y^2 = a^2$  and  $xy = c^2$  cut orthogonally.
28. How many rows needed (i)  $P \vee \rightarrow \wedge (P \vee Q)$   
(ii)  $(P \vee Q) \wedge (\rightarrow P \vee S) \wedge (\rightarrow P \wedge \wedge V)$
29.  $\lim_{x \rightarrow 0} \frac{1 - \cos x}{x^2}$   $x \log x$
30. Find critical number  $f(x) = x^{\frac{4}{5}} (x-4)^2$

PART B

31. A particle is fired from ground to reach a height of 5 feet in  $t$  seconds  $S(t) = 128t - 16t^2$
- compute maximum height
  - What is velocity when the particle hit ground
32. Using Lagrange  $f(x) = x^3 - 3x + 2$   $x \in [-2, 2]$
33. Expand  $\sin x$  in ascending power  $x$   $\frac{1}{4}$  upto three terms.
34. Determine Interval of Concavity  $y = 3 + \sin x$
35.  $A = \begin{pmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 \end{pmatrix}$   $B = \begin{pmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 \end{pmatrix}$   $C = \begin{pmatrix} 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 \end{pmatrix}$
- Find (i)  $A \vee B$  (ii)  $(A \wedge B) \vee C$
36. Show that  $\neg(P \vee Q) \equiv \neg P \vee \neg Q$
37. Show that  $Q \rightarrow P \equiv \neg P \rightarrow \neg Q$
38. Find point of curve  $y = x^3 - 3x^2 + x - 2$  tangent is parallel to line  $y = x$
39.  $\lim_{\theta \rightarrow 0} \left( \frac{1 - \cos m\theta}{1 + \cos n\theta} \right) = 1$  Prove  $m \pm n$
40.  $*$  defined  $(a * b) = a + b + ab - 7$  binary  $R$ ?  
IF So find  $3 * \frac{-7}{15}$ .

5 marks Any 7

41. A conical tank with vertex down of 12 meters height has radius 5 meter at the top. If water flows into the tank at rate 10 cubic meter per second how fast is depth water increase when 8 meter deep?
42. If curve  $ax^2 + by^2 = 1$  and  $cx^2 + dy^2 = 1$  intersect each other orthogonally  $\frac{1}{a} - \frac{1}{b} = \frac{1}{c} - \frac{1}{d}$  Intersect
43. Expand  $\sin x$  as a series power  $x$  upto 5 terms
44. For the function  $f(x) = 4x^3 + 3x^2 - 6x + 1$  Interval monotonicity, local extrema, Intervals of concavity and point of Inflection
45.  $\lim_{x \rightarrow \pi/2} \frac{(\tan x)}{(\sin x)}$   $(\sin x)$   $(\tan x)$
46. Sketch the curve  $y = f(x) = x^2 - x - 6$
47. A hollow cone base radius  $a$  cm and height  $b$  cm placed on a table. Show that volume of cylinder  $\frac{4}{9}$  times volume of cone
48. verify Closure, commutative, associative, Identity, Inverse addition modulo 5.
49. Prove  $P \rightarrow Q \equiv (P \wedge Q) \rightarrow Q$
50. If we blow air into balloon of spherical shape at rate 1000  $\text{cm}^3$  per sec. radius balloon change 7cm? Also compute rate surface