VICTORY TUITION CENTRE, CBE-25 REVISION TEST 1 (VOLUME - II)

CLASS:XII   MATHEMATICS   MARKS:70

I ANSWER ANY 7 Q.NO 10 IS COMPULSORY   7X2=14

1. Find the values in the inverval (1,2) of the mean value theorem satisfied by the function f(x0=x-x^2 for $1 \leq x \leq 2$

2. Find the pointy on the curve y=x^2-5x+4 at which the tangent is parallel to the line 3x+y=7

3. Let g(x)=x^2+sinx calculate dg

4. Evaluate $\int_0^{\frac{\pi}{2}} cos^7 x \, dx$

5. Determine the order and degree(if exists) of $e^{\frac{d^2 y}{dx^2}} + sin(x) \frac{dy}{dx}$ =2

6. The mean and variance of a binomial variable x are 2 and 1.5 find P(x=1)

7. A lottery with 600 tickets gives one prize of Rs. 200, four prizes Rs.100 and six prizes of Rs.50. If the ticket cost is Rs.2, find the expected winning amount of a ticket.

8. Write the converse, inverse and contrapositive of (1) If x and y are numbers such that x=y, then x^2=y^2

9. Let A=$\begin{bmatrix} 0 & 1 \\ 1 & 1 \end{bmatrix}$, B= $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$ be any two Boolean matrices of the same type, find A $\wedge$ B , and A $\vee$ B

10. Evaluate $\int_{-log2}^{log2} e^{-|x|}$ dx

II ANSWER ANY 7 Q.NO 20 IS COMPULSORY   7X3=21

11. On Z, define * by (m*n)=m^n +n^m: $\forall$ $m, n \in$ Z, Is * binary on Z?

12. Construct the truth table $\neg p \wedge \neg q$

13. The probability that a certain kind of component will survive a electrical test is ¾. Find the probability that exactly 3 of the 5 components tested survive.

14. Show that y=mx+$\frac{7}{m}$, m≠0 is a solution of the differential equation   xy′ +7$\frac{1}{y'}$-y = 0

15. Evaluate $\int_{-4}^{4} |x + 3| dx$

16. Evaluate $\int_0^{\frac{\pi}{2}} x^2 cos2x \, dx$

17. The time T taken for a complete oscillation of a single pendulum with length l, is given by the equation T=2$\pi \sqrt{\frac{l}{g}}$, where g is a constant. Find the approximate percentage error in the calculated value of T corresponding to an error of 2 percent in the value of l.

18. If U(x,y,z) = log (x^3+y^3+z^3) find $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$

19. Evaluate $\lim_{x \to 0^+} x \log x$

20. Salt is poured from a conveyer belt at a rate of 30 cubic metre per minute forming a conical pile with a circular base whose height and diameter of base are always equal. How fast is the height of the pile increasing when the pile is 10 metrre high?

III ANSWER THE FOLLOWING   7X5=35

21 a) A conical water tank with vertex down of 12metres height has a radius of 5 metre at the top. If water flows into tank at a rate 10 cubic m/min, how fast is the depth of the water increases when the water is 8 metres deep? (OR)

b) Prove that the ellipse $x^2+4y^2=8$ and the hyperbola $x^2-2y^2=4$ intersect orthogonally.

22a) A hollow cone with base radius a cm and height b cm is placed on a table. Show that the volume of the largest cylinder that can be hidden underneath is 4/9 times volume of the cone. (OR)

b) Prove that $\int_0^{\frac{\pi}{4}} \log(1 + tanx)\ dx = \frac{\pi}{8}\log 2$

23 a) Find the area of the region bounded by the line 7x-5y=35. X axis and the lines x=-2 and x=3 (OR)

b) Find the area of the region bounded between the curves y=sinx and y=cosx and the lines x=0 and x=π

24 a) Solve $(1+x^2)\frac{dy}{dx} = 1+y^2$ (OR)

b) In a certain chemical reaction, the rate of conversion of a substance at time t is proportional to the quantity of the substance still untransformed at that instant. At the end of the one hour, 60 grams remain, and at the end of 4 hours 21 grams how many grams of the substance was there initially?

25a) A random variable x has the following probability mass function

X	1	2	3	4	5	6
F(x)	k	2k	6k	5k	6k	10k

Find (i) P(2<x<6) (ii) P(X$\leq$ 4) $(iii)\ p(3 < X)$ (OR)

b) Verify (i) closure property (ii) commutative property (iii) associative property, (iv) existence of identity and (v) existence of inverse for the operation $+_5$ on Z_5 using table corresponding to addition modulo 5

26 a) If μ and σ^2 are the mean and variance of the discrete random variable X and E(x+3)=10 and E(X+3)^2 =16 find μ and σ^2 (OR)

b) Prove that p$\to (\neg q\ \vee r) \equiv\ \neg p \vee (\neg q \vee r)$

27a) If u=sec$^{-1}(\frac{x^3-y^3}{x+y})$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ = 2cotu (OR)

b) If u=tan$^{-1}(\frac{x^3+y^3}{x-y})$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ = sin2u.