

B.VOC DEGREE (C.B.C.S.S) EXAMINATION, APRIL 2018
(2017 Admission Regular & 2016 Admission Improvement / Supplementary)
SEMESTER II – SKILL THEORY (SOFTWARE DEVELOPMENT)
VSD2S06TB - APPLIED MATHEMATICS

Time: Three Hours

Maximum Marks: 80

PART A**I. Answer all questions .Each question carries 1 mark**

1. Define echelon form of a matrix
2. Find the order of a matrix $\begin{bmatrix} 1 & 4 & 3 \\ 5 & 2 & 6 \end{bmatrix}$
3. Find $\frac{\partial z}{\partial y}$ if $z=e^{xy}+\cos y$
4. Write the degree and order of the equation $(\frac{dy}{dx})^4 + 5\frac{d^2y}{dx^2} = 0$
5. Write equations relating rectangular and cylindrical coordinates
6. Write an example for diagonal matrix.
7. Give an example for a linear differential equation with constant coefficient.
8. Define Lagrange's partial differential equations.
9. Write Fubinis theorem for rectangle.
10. Give the formula for implicit differentiation using chain rule (10x1=10)

PART B**II. Answer any eight questions .Each question carries 2 marks**

11. Compute the second order partial derivative of the function
 $g(x, y) = x^2 y + \sin y + x \sin y$
12. Find the characteristic polynomial of A $\begin{bmatrix} 1 & 2 & 1 \\ 6 & -1 & 0 \\ -1 & -2 & -1 \end{bmatrix}$
13. Solve $\frac{d^2y}{dx^2} - 2a\frac{dy}{dx} + a^2y = 0$.
14. Find the rank of $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 1 \\ 1 & 1 & 2 \end{bmatrix}$
15. Evaluate $\int_1^3 \int_2^4 9x^3y^2 dydx$
16. If $A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$ find $A^2 + 2A + 5I$
17. State cayley Hamilton theorem
18. $Y_1 = \sin 3x, Y_2 = \cos 2x$ find $W(Y_1, Y_2)$.
19. Reduce $A = \begin{bmatrix} 1 & 2 & 3 & -1 \\ 4 & 5 & 6 & 3 \\ 7 & 8 & 9 & 5 \end{bmatrix}$ into echelon form.
20. Evaluate $\int_0^3 \int_0^2 (4 - y^2) dydx$

21. The sum of three numbers is 6. If we multiply the third number by 3 and add second number to it, we get 11. By adding first and third numbers, we get double of the second number. Represent this in matrix form
22. Form a partial differential equation by eliminating a and b from the equation $z=(x-a)^2+(y-b)^2$.

(8x2=16)

PART C

III. Answer any six questions .Each question carries 4 marks

23. Solve by Cramer's rule $3x + y + z = 3; 2x + 2y + 5z = -1 ; x - 3y - 4z = 2$
24. Evaluate $\int_0^{\frac{\pi}{3}} \int_0^{\cos y} x \sin y dx dy$.
25. Find all eigen values and corresponding eigen vectors of $\begin{bmatrix} 0 & 1 \\ -6 & 5 \end{bmatrix}$
26. Solve $x(y-z)p+y(z-x)q=z(x-y)$.
27. Solve initial value problem $y''' + y'' = 0$ with $y(0)=1, y'(0) = 0, y''(0) = 1$
28. If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ find A^2 using Cayley Hamilton theorem
29. Use Chain rule to find the derivative of $w = x^2 + y^2$ with respect to t along the path $x = \cos t, y = \sin t$. What is the derivatives value at $t = \pi$.
30. Evaluate $\int_{-1}^2 \int_0^3 \int_0^2 12xy^2z^3 dz dy dx$.
31. Find the general solution of $9 \frac{d^2y}{dx^2} - 6 \frac{dy}{dx} + y = 0, y(0)=3$ and $y'(0) = -1$

(6x4=24)

PART D

IV. Answer any two questions .Each question carries 15 marks

32. Evaluate $\int_0^{\sqrt{2}} \int_0^{3y} \int_{x^2+3y^2}^{8-x^2-y^2} (x^2 + y^2 + z^2) dz dx dy$
33. Show that $w = 5 \cos(3x + 3ct) + e^{-x+ct}$, where c is a constant satisfies the wave equation $\frac{\partial^2 w}{\partial t^2} = c^2 \frac{\partial^2 w}{\partial x^2}$.
34. Solve using the method of variation of parameters $y''' + 2y'' - y' - 2y = e^{2x}$ (15x2=30)
35. Solve the system of equation $x+y+z=2; x+2y+3z=5; x+3y+6z=11; x+4y+10z=21$

(2x15=30)