B. VOC. DEGREE (C.B.C.S.S) EXAMINATION, MARCH 2017
(2016 Admission - Regular & 2015 Admission - Supplementary / Improvement)
SEMESTER II - SOFTWARE DEVELOPMENT
VSD2S04TB - APPLIED MATHEMATICS

Time: Three Hours   **Maximum Marks: 80**

PART A

I.   Answer all questions. Each question carries 1 mark

1.   Write the degree and order of the equation$(\frac{d^2y}{dx^2})^5 +5(\frac{d^3y}{dx^3})=0$
2.   State Euler's theorem
3.   Write equations relating cylindrical and spherical coordinates.
4.   Write the order of the matrix $\begin{bmatrix} 3 & 1 \\ 0 & 2 \\ 4 & 1 \end{bmatrix}$
5.   Give an example for a non homogenous linear differential equation with constant coefficient.
6.   Find $\frac{\partial z}{\partial x}$ if z=$cosx$+sin$x$
7.   Define a singular matrix
8.   Write Fubinis theorem for rectangle
9.   Write the multiplication rule of two matrices.
10.   State Chain rule for two variable

(10x1=10)

PART B

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

11. Find the rank of $\begin{bmatrix} 0 & i & -i \\ -i & 0 & i \\ i & -i & 0 \end{bmatrix}$
12. Evaluate $\int_1^3 \int_0^2 (xy + x^2y^3)dydx$
13. Solve $y''' + 6y'' + 11y' + 6y = 0$
14. Reduce A=$\begin{bmatrix} 3 & -10 & 5 \\ -1 & 12 & -2 \\ 1 & -5 & 2 \end{bmatrix}$ to echelon form
15. if x=$\begin{bmatrix} 3 & 1 \\ 5 & 2 \end{bmatrix}$ and y= $\begin{bmatrix} 1 & 2 \\ 1 & 5 \end{bmatrix}$ find x+y
16. Y1=cos3x, Y2=sin2x find W(Y1,Y2).
17. Define equal and equivalent matrices with example.
18. Form a partial differential equation by eliminating a and b from the equation z=ax+by+a²+b².

19.   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

20. Find the characteristics equation of the matrix $A=\begin{bmatrix} 1 & 2 & 1 \\ 0 & -5 & 0 \\ 1 & 8 & 1 \end{bmatrix}$

21. Compute the second order partial derivative of the function $g(x,y)=e^{xy}+\sin 2y+\cos y$

22. Evaluate $\int_1^3 \int_2^4 (40-2xy)dydx$

(8x2=16)

PART C

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

23. Find the general solution of $\frac{d^2y}{dx^2}+y=0$

24. Solve by cramer's rule:5x+3y+7z=4;3x+26y+2z=9;7x+2y+10z=5

25. Solve (y-z)p+(z-x)q=x-y

26. Find all eigen values and corresponding eigen vectors of $\begin{bmatrix} 1 & 4 \\ 2 & 3 \end{bmatrix}$

27. Evaluate $\int_0^1 \int_{-x}^{x^2} y^2 \, xdydx$

28. Solve the initial value problem $y''-3y'+2y=0$ with y=0 and $y'=1$ when x=0.

29. If $A=\begin{bmatrix} 1 & 1 \\ 2 & 1 \end{bmatrix}$ find A^2 using cayley Hamilton theorem

30. The plane x=1 intersects the paraboloid $z=x^2+y^2$ in a parabola. Find the slope of the tangent to the parabola at (1, 2, 5).

31. Evaluate $\int_1^2 \int_2^3 \int_0^1 8xyz \, dzdxdy$

(6x4=24)

PART D

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

32. Solve using the method of variation of parameters $y''+9y=sec3x$

33. Solve the system of equations: 2x-5y+7z=6;x-3y+4z=3;3x-8y+11z=11

34. Show that $w=5\cos(3x+3ct)+e^{x+ct}$, where c is a constant satisfies the wave equation

$$\frac{\partial^2 w}{\partial t^2}=c^2\frac{\partial^2 w}{\partial x^2}.$$

35. Use polar coordinates to find the volume of the solid above the cone $z=\sqrt{x^2+y^2}$ and below the sphere $x^2+y^2+z^2=1$.

(2x15=30)