

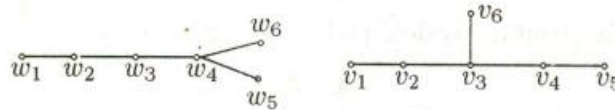
B.COM. DEGREE EXAMINATION NOVEMBER 2023
HONOURS
THIRD SEMESTER

COURSE : ALLIED – CORE
PAPER : MATHEMATICS FOR COMMERCE
SUBJECT CODE : 20BH/AC/MC35
TIME : 3 HOURS MAX. MARKS: 100

SECTION – A

ANSWER ALL QUESTIONS: (10 x 2 = 20)

1. State Cayley-Hamilton Theorem
2. Find the eigenvalues of the matrix $\begin{pmatrix} 1 & 1 \\ 3 & -1 \end{pmatrix}$.
3. Find one root of the equation $x^3 - 12x^2 + 39x - 28 = 0$ whose roots are in A.P.
4. If α, β, γ are the roots of the equation $x^3 + px^2 + qx + r = 0$, find the value of $\sum \alpha^2$.
5. What is the condition for convergence of Gauss-Jordan method of iteration?
6. Write Newton-Raphson iterative formula.
7. Draw 3-regular graph on 6 vertices.
8. Verify whether the following graphs are isomorphic.



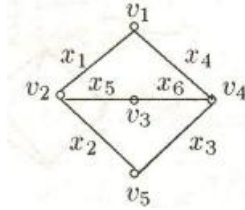
9. Write the values of permutation $P(n, r)$ and combination $C(n, r)$.
10. Write the rules of sum and product.

SECTION – B

ANSWER ANY FIVE QUESTIONS: (5 x 8 = 40)

11. Find the eigenvalues and eigenvectors of the matrix $\begin{pmatrix} 7 & -2 & 0 \\ -2 & 6 & -2 \\ 0 & -2 & 5 \end{pmatrix}$.
12. Given that $-2 + \sqrt{-7}$ is a root of the equation $x^4 + 2x^2 - 16x + 77 = 0$, solve it completely.
13. Using Newton iterative method find the root between 0 and 1 of $x^3 = 6x - 4$ correct to 2 decimal places.
14. Solve the system of equation by Gauss-elimination method.
$$\begin{aligned} 10x - 2y + 3z &= 23 \\ 2x + 10y - 5z &= -33 \\ 3x - 4y + 10z &= 41 \end{aligned}$$

15. Write the adjacency and incidence matrix of the following graph.



16. Define tree graph and draw all trees on 6 vertices.

17. In how many ways can ten adults and five children stand in a line so that no two children are next to each other?

SECTION – C

ANSWER ANY TWO QUESTIONS:

(2 x 20 = 40)

18. a) Verify Cayley- Hamilton theorem and find A^{-1} when $A = \begin{pmatrix} 2 & -1 & 2 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$.

(10 marks)

b) Solve $6x^5 + 11x^4 - 33x^3 - 33x^2 + 11x + 6 = 0$.

(10 marks)

19. a) Solve by Gauss-Seidal method

$$83x + 11y - 4z = 95$$

$$7x + 52y + 13z = 104$$

$$3x + 8y + 29z = 71.$$

(14 marks)

b) Find the coefficient of x^5y^2 in the expansion of $(x + y)^7$.

(6 marks)

20. a) Solve the equation $x^3 - 4x^2 - 3x + 18 = 0$ given that two of its roots are equal.

(10 marks)

b) Define the following with suitable examples.

(10 marks)

(i) Complete graph

(ii) bipartite graph

(iii) cycle graph

(iv) bridge

(v) cut vertices
