

B. Com. / B.Com.(A&F) DEGREE EXAMINATION, NOVEMBER 2017  
THIRD SEMESTER

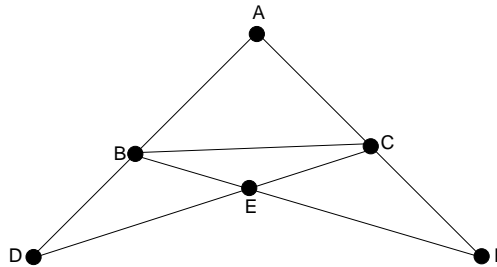
COURSE : ALLIED – CORE  
PAPER : MATHEMATICS FOR COMMERCE  
TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A  
ANSWER ALL THE QUESTIONS

(10 X 2 = 20)

1. Show that the matrix  $\begin{pmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{pmatrix}$  is orthogonal.
2. State Cayley Hamilton theorem.
3. Obtain a third degree equation if two of its roots are 2 and  $3i$ .
4. If  $\alpha, \beta, \gamma$  are the roots of the equation  $x^3 + px^2 + qx + r = 0$ , find the value of  $\sum \alpha^2$
5. Write down Newton Raphson formula for finding the root of an equation.
6. How do you solve a system of linear equations by Gauss elimination method?
7. When do you say that two graphs are isomorphic?
8. Find the degree of each vertex of the following graph.



9. A committee of 3 is to be chosen out of 5 Englishmen, 4 French men and 3 Indians and the committee should contain one of each nationality. In how many ways can this be done?
10. Find the 8<sup>th</sup> term in the expansion of  $\left(2x + \frac{1}{y}\right)^9$ .

SECTION – B  
ANSWER ANY FIVE QUESTIONS

(5 X 8 = 40)

11. Verify Cayley Hamilton theorem for the matrix  $\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ .
12. Solve the equation  $x^3 - 12x^2 + 39x - 28 = 0$  given that the roots are in arithmetic progression.
13. Solve the equation  $x^4 - 4x^2 + 8x + 35 = 0$  given that  $2 + i\sqrt{3}$  is a root.

14. Find a real root of the equation  $x^3 - 9x + 1 = 0$  correct to four decimal places by bisection method.
15. Solve the system of equations  $x + 2y + z = 3$ ,  $2x + 3y + 3z = 10$ ,  $3x - y + 2z = 13$  by Gauss Jordan method.
16. Show that in any group of two or more people, there are always two with exactly the same number of friends inside the group.
17. (a) Write the pigeon hole principle.  
 (b) Find the coefficient of  $x^9 y^3$  in the expansion of  $(2x - 3y)^{12}$ .

**SECTION – C**  
**ANSWER ANY TWO QUESTIONS**

**(2 X 20 = 40)**

18. Find the eigen values and eigen vectors of the matrix  $\begin{pmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{pmatrix}$
19. a) Solve the equation  $6x^5 - x^4 - 43x^3 + x - 6 = 0$   
 b) Find the value of  $\sqrt{12}$  correct to 4 places of decimals by Newton Raphson method. (10+10)
20. a) Define the following and give an example of each.  
 (i) subgraph of a graph  
 (ii) connected graph  
 (iii) components of a graph  
 (iv) Eulerian graph  
 v) Hamiltonian graph
- b) A cricket team of 11 players is to be selected from two sets consisting of 6 and 8 players respectively. In how many ways can the selection be made on the assumption that the first set of 6 players contribute not fewer than 4 players? (10+10)



