Stella Maris College (Autonomous), Chennai – 600 086

(For candidates admitted during the academic year 2019–20& thereafter)

SUBJECT CODE :19MT/AC/MS35

B.C.A DEGREE END SEMESTER EXAMINATION, December 2020

BRANCH I - MATHEMATICS

THIRD SEMESTER

COURSE : ALLIED – CORE

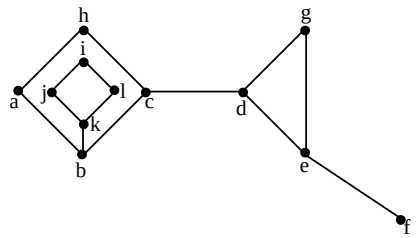
PAPER : MATHEMATICS FOR COMPUTER SCIENCE I

TIME : 90 Mins **MAX. MARKS : 50**

Section – A

Answer ALL questions (3 × 2 = 6)

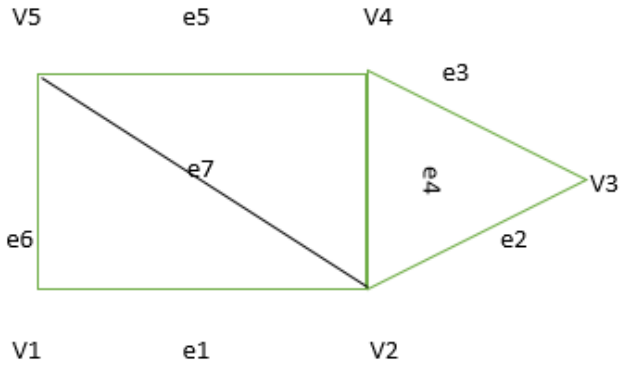
1. Define an even and odd function.
2. If $\vec{F} = x^2z\hat{\imath} - 2y^3z^2\hat{\jmath} + xy^2z\hat{k}$, find $div\ \vec{F}$.
3. Find the cut vertices and bridges of the following graph.



Section – B

Answer any THREE questions (3 × 8 = 24)

4. Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$
5. Expand $f(x) = x\ (-\pi < x < \pi)$ as a Fourier Series with period 2π.
6. Prove that $\vec{F} = (y^2 \cos x + z^3)\hat{\imath} + (2ysin\ x - 4)\hat{\jmath} + 3xz^2\hat{k}$ is irrotational and find its scalar potential.
7. Define Adjacency and Incidence matrix of a graph. Also find the Adjacency and Incidence Matrix of the following graph



Section – C
Answer any ONE question (1 × 20 = 20)

8. (a) Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 2 & -3 & 1 \\ 3 & 1 & 3 \\ -5 & 2 & -4 \end{bmatrix}$

(b) Find the equation of the tangent plane and normal to the surface $x^2 + y^2 + z^2 = 25$ at (4,0,3).

(12 + 8)

9. (a) Expand the function $f(x) = e^x$ in a series of cosines in $(0, \pi)$.

(b) A company making cold drinks has two bottling plants located at towns T_1 and T_2. Each plant produces three drinks A, B and C and their production capacity per day is given below

Cold drinks	Plant at	
	T_1	T_2
A	6000	2000
B	1000	2500
C	3000	3000

The marketing department of the company forecasts a demand of 80,000 bottles of A, 22,000 bottles of B and 40,000 bottles of C during the month of June. The operating costs per day of plants at T_1 and T_2 are Rs. 6000 and Rs.4000 respectively. Find graphically the number of days for which each plant must be run in June so as to minimize the operating costs while meeting the market demand

(8 + 12)

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