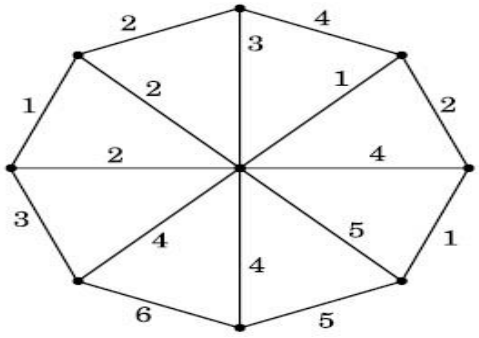
PILLAI COLLEGE OF ENGINEERING, NEW PANVEL
(Autonomous) (Accredited 'A+' by NAAC)
END SEMESTER EXAMINATION
May 2023

BRANCH: Electronics and Computer Engineering

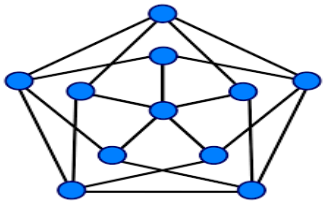
SEM-IV

Subject: - Engineering mathematics IV	**Time: 02.00 Hours**
Max. Marks: 60 **N.B 1. Q.1 is compulsory** **2. Attempt any two from the remaining three questions** **3. Each Question carry 20 marks.**	**Date: 02/05/2023** **Subject Code:-EC208**

Q.1.	**Attempt All**	**Marks**
a)	Use Kruskal's algorithm to find minimum spanning tree. Also find the minimum cost/weight.  	**5**
b)	Find Spearman's Rank Correlation Coefficient (R) for the following data giving marks of 7 students in Mathematics (X) and Data Structures & Algorithm (Y). Student | Zaraa | Harshal | Sarvesh | Rishiraj | Samruddha | Nobita | Shizuka **Marks in Mathematics** | 33 | 40 | 30 | 59 | 34 | 34 | 40 **Marks in DSA** | 39 | 43 | 28 | 55 | 33 | 39 | 39	**5**
c)	Use Gram-Schmidt process to find an orthonormal basis from a given set of vectors $\{u_1,u_2,u_3\}$ where $u_1=(1,1,0)$, $u_2=(1,0,1)$ and $u_3=(0,1,1)$.	**5**
d)	Solve the given inhomogeneous recurrence relation $a_n=2a_{n-1}+n$ with initial condition $a_0=1$.	**5**
Q.2.	**Attempt All**	
a)	Consider a set A={1,2,3,4,,5,6,8,10,15,30} with the relation of divisibility. Then draw the Hasse diagram of the poset (A,|). Also find the maximal, maximum, minimal and minimum elements of the poset.	**4**
b)	Using Green's Theorem evaluate the integral $\oint_C(2ydx-3xdy)$ where C is the curve given by |z-1|=3.	**4**

c) **6**

- For which values on 'n' is the complete graph K_n Eulerian. (Explain)
- For which values of 'm' & 'n' is the complete bipartite graph $K_{m,n}$ is Semi-Eulerian. (Explain)
- Find the Hamiltonian circuit/ path in given graph if it exists.



d) **6**

Consider the given data

X	-3	-2	-1	0	1	2	3
Y	15.5	9.5	3.5	0.5	-0.5	0.5	3.5

Fit a second degree curve to the given data.

Q.3. **Attempt All**

a) Draw the complete graph K_5 and verify Handshaking lemma for it. **3**

b) Use Cauchy's residue formula to evaluate $\oint_C \frac{dz}{z^2(z+1)}$ where C is a circle $|z|=2$. **4**

c) **6**

The IQ given by random variable X for a certain population is normally distributed with mean 100 and standard deviation 15.

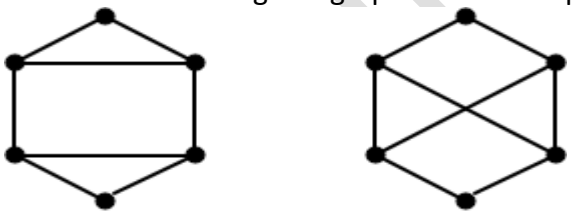
i) Find the percentage of people having IQ between 85 and 115.
ii) Find the percentage of people having IQ above 130.
iii) Find P(|X-100|<15)

d) Let $A=\begin{bmatrix}4 & 6\\ 3 & 8\end{bmatrix}$. Find the QR decomposition of A. **7**

Q.4. **Attempt All**

a) **5**

Check whether the given graphs are isomorphic or not.



b) Find Taylor's or Laurent's series expression for $f(z)=\frac{z-1}{z^2-2z-3}$ in the region $1<|z|<3$. **5**

c) Show that D24 i.e. set of divisors of 24 forms a lattice. **5**

d) **5**

Let X be a discrete random variable with following probability distribution function with mean 2.85 . Determine m and n. Also find variance in X.

X	1	2	3	4	5	6
P(X=x)	0.2	0.3	0.1	m	n	0.2