



**Dated: 18.02.2022**

**Maximum Marks: 20**

**Time Allowed: 01 Hour**

**NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.**

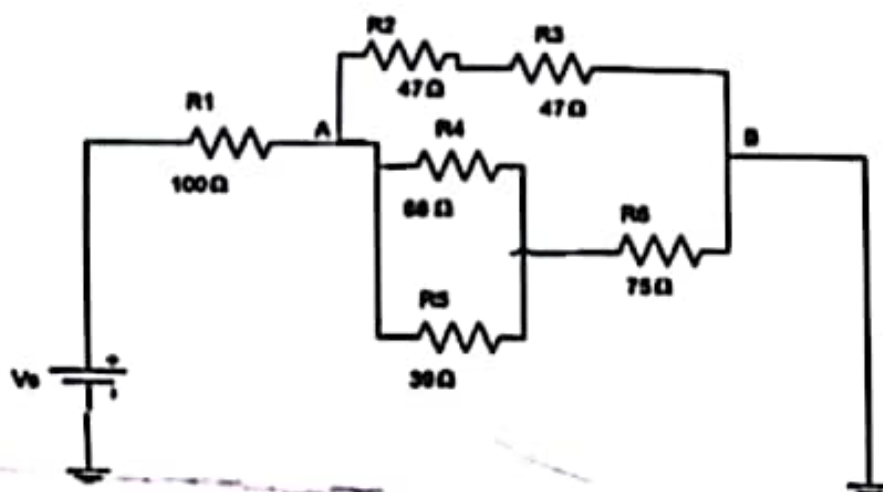
**Q.01 (a) State Ohm's law and graphically show that  $V$  and  $I$  are directly proportional with each other. CLO-1 05**

**(b) What do you know resistors? Explain Fixed resistors. CLO-1 05**

**Q.02 Derive the current divider and voltage divider formula for electric circuits. CLO-2 10**

**Q.03 (a) What do you know about series-parallel combination of resistors? CLO-1 04**

**(b) Find the total resistance between the positive and negative terminals of the battery shown in figure below. CLO-2 06**



**Good Luck**



SUBJECT: LINEAR ALGEBRA & ANALYTICAL GEOMETRY

Dated: 15.02.2022

Maximum Marks: 20

Time Allowed: 01 Hr

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.No.	QUESTIONS	CLO	Taxonomy Level
01(a)	Define nilpotent, Idempotent and periodic matrix show that $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$ is idempotent matrix	CLO-1	C1
✓(b)	Convert the matrix $A = \begin{bmatrix} 6 & 3 & -4 \\ -4 & 3 & 2 \\ 1 & 2 & -5 \end{bmatrix}$ into echelon form	CLO-1	C2
02(a)	Define consistency criteria for square homogeneous system.	CLO-1	C1
(b)	What value of $\lambda$ the equations have non-trivial solutions? $(5 - \lambda)x + 4y + 2z = 0$ $4x + (5 - \lambda)y + 2z = 0$ $2x + 2y + (2 - \lambda)z = 0$	CLO-1	C1
03(a)	Define the following: (i) Rank of matrix (ii) Consistent and Inconsistent system	CLO-1	C1
(b)	Show that $ A  = \begin{vmatrix} x & a & a & a \\ a & x & a & a \\ a & a & x & a \\ a & a & a & x \end{vmatrix} = (x + 3a)(x - a)^3$	CLO-1	C2

**GOOD LUCK**



SUBJECT: ENGINEERING DRAWING & GRAPHICS

Dated: 17.02.2022

Maximum Marks: 10

Time Allowed: 45 Minutes.

NOTE: ATTEMPT ANY TWO (02) QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.01 ✓ A point P is 50mm from H.P. and V.P. Draw its projections in first and third quadrants.

Q.02 1. If a Point "a" is 5 cm in front of V.P and 4 cm below H.P. Draw Its Projection on X.Y Plane.

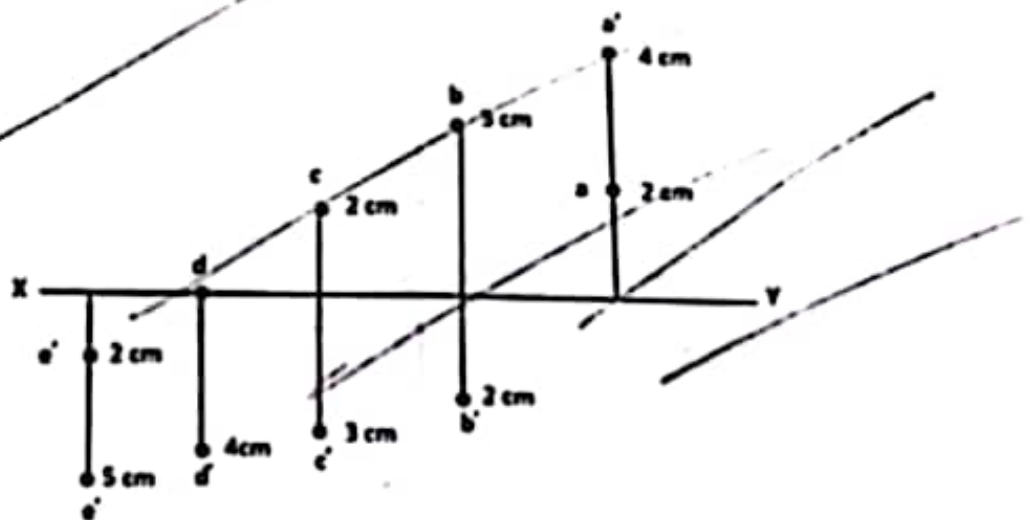
2. If a Point "b" is 6 cm behind V.P and 3 cm below H.P. Draw Its Projection on X.Y Plane.

3. If a Point "c" is 6 cm in front of V.P and 4 cm above H.P. Draw Its Projection on X.Y Plane.

4. If a Point "d" is 5 cm behind V.P and 7 cm above H.P. Draw Its Projection on X.Y Plane.

5. If a Point "e" is 7 cm in front of V.P and 7 cm below H.P. Draw Its Projection on X.Y Plane.

Q.03 ✓ Projections of various points are given in figure below. State the position of each point with respect to the plane of projection, giving the distance in centimeters.



Good Luck





**QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH**

**FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER - SECOND YEAR 2022 OF 20 BATCH B.E (EE)**

**SUBJECT: ENGINEERING DRAWING & GRAPHICS**

**Dated: 02.06.2022**

**Maximum Marks: 30**

**Time Allowed: 02 Hours**

**NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.**

Q. No.	QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01	(a) Write In detail importance of Engineering Drawing and Graphics In the field of Environmental Engineering?	1	C2	1	06
	(b) Enlist types of line and describe any four of them.	1	C2	1	04
Q. 02	(a) A Line XY Is 10cm Long and It is lying on X-axis. Draw a regular pentagon using the line XY.	2	C3	2	05
	(b) Draw a neat and clean sketch of an Octagon inscribed in a circle, having the principle line 80mm long.	2	C3	2	05
Q. 03	(a) A line AB Is 30mm long and It is in first quadrant. One of its ends is 10mm in front of VP and 7mm above HP, if the line is parallel to HP and perpendicular to VP. Draw its projections on XY-plane.	2	C3	2	05
	(b) A line PQ Is 45 mm long. One of its ends P is 15mm behind VP and 10mm below HP, if the line is perpendicular to HP and parallel to Vp. Draw its projections on XY-plane.	2	C3	2	05

**The End**



Q. No.	QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01	(a) State and Explain Kirchhoff's laws for electric circuits.	1	C1	1	06
	(b) Use Mesh-current method to find the unknown mesh currents of the following network.	3	C2	2	06
Q. 02	(a) Explain the principles of a magnetic field. Also define the terms magnetic flux and magnetic flux density.	1	C1	1	06
	(b) Mild steel has a relative permeability of 800. Calculate the reluctance of a mild steel core that has a length of 10 cm and has a cross-section of 1.0 cm x 1.2 cm.	3	C2	2	06
Q. 03	(a) Discuss Faraday's law of electromagnetic Induction. Also define Lenz's law.	1	C1	1	08
	(b) Apply Faraday's law to find the induced voltage across a coil with 500 turns that is located in a magnetic field that is changing at a rate of 8000 μ wb/s.	2	C1	2	04
Q. 04	(a) Explain the principle of operation of a transformer. Also define turns ratio.	1	C1	1	06
	(b) Explain the principle of operation of a dc generator and dc motor.	1	C1	1	06
Q. 05	(a) What do you know about electric supply system? Draw a typical AC power supply scheme.	1	C1	1	06
	(b) Discuss comparison of DC and AC transmission.	1	C4	1	06





## SUBJECT: FLUID MECHANICS

Dated: 30.05.2022

Maximum Marks: 60

Time Allowed: 03 Hours

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.	QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01 (a)	Highlight the three main aspects of kinematics of fluid. How the velocity and acceleration components are obtained by using Lagrangian method.	02	02	01	04
(b)	Identify the type of flow for the following examples: a) Motion of liquid in a rotating tank b) Flow above a drain hole of stationary tank or wash basin c) Flow through a capillary tube and ground water flow d) Flow of gases through nozzles, orifices, gas turbines etc. e) Flow through a prismatic and non-prismatic conduit	02	03	01	04
(c)	Enlist the type of flow line; define streak line with examples.	02	02	01	04
Q. 02 (a)	The continuity equation in Cartesian co-ordinates is given as $\partial \rho / \partial t + \partial / \partial x (\rho u) + \partial / \partial y (\rho v) + \partial / \partial z (\rho w) = 0$ . Enlist types of flow where this equation is applicable. Using this equation, write the equation for steady flow, incompressible flow and two-dimensional flow. Examine whether the velocity components, i.e. $u_r = r \sin \theta$ , $u_\theta = 2r \cos \theta$ represents a physically possible flow or not.	01	03	02	04
(b)	Referring to Fig. 01, find the discharge through the pipe and also determine the velocity at section 3 if the average velocity in 20 cm diameter pipe is 2 m/s.	01	03	02	04
Q. 03 (a)	Derive an expression for Euler's equation of motion (see Fig. 02). If the fluid flow is incompressible, obtain the Bernoulli's equation from Euler's equation of motion.	02	03	02	04
(b)	A pump is 2.2 m above the water level in the sump and has a pressure of (-20 cm) of mercury at suction side. The suction pipe is of 20 cm diameter and delivery pipe is short 25 cm diameter pipe ending in a nozzle of 8 cm diameter. If the nozzle is directed vertically upward at an elevation of 4.2 m above the water sump level, determine i) the discharge and the elevation above the water sump level, to which jet would reach (Fig. 03). Neglect all losses.	02	03	02	04
Q. 04 (a)	List out the practical applications of Bernoulli's equation. Derive an expression for theoretical and actual discharge through venturimeter by applying Bernoulli's equation.	02	1, 3	02	04
(b)	A venturimeter having throat diameter of 10.5 cm is fitted to a water pipeline of internal diameter 21 cm in order to monitor the flow rate. To improve the accuracy of measurement, pressure difference across the venturimeter is measured with the help of an inclined tube manometer, the angle of inclination being $30^\circ$ (see Fig. 04). For a manometer reading of 9.5 cm, find the flow rate. (Take $C_d = 0.984$ )	02	03	02	04
(c)	Referring to Fig. 05, show that up thrust/buoyancy force = $V\rho g$ .	02	02	02	04
Q. 05	Derive Darcy's equation for the loss of head due to friction in pipes. Find the head loss due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/sec.	03	03	02	04

SUBJECT: LINEAR ALGEBRA & ANALYTICAL GEOMETRY

Dated: 26.05.2022

Maximum Marks: 60

Time Allowed: 3 Hours.

NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.	QUESTION	CLOs	Taxonomy Level	PLOs	Marks
Q. 01	(a) Find the equations of straight line in vector form, parametric form and symmetric form.	2	C1	2	06
	(b) Find the equations of the straight L and M in symmetric form. Determine whether the pair of lines intersect find the point of intersection if it exists. L: through A(2, 1, 3), B(-1, 2, -4) M: through P(5, 1, -2), Q(0, 4, 3)	2	C1	2	06
Q. 02	(a) Show that the points (1, 6, 1), (1, 3, 4), (4, 3, 1) and (0, 2, 0) are the vertices of regular tetrahedron.	2	C2	2	06
	(b) The direction cosines $l, m, n$ of two straight lines are given by the equations $l + m + n = 0$ and $2lm + 2ln - mn = 0$ find the measure of angle between them.	2	C1	2	06
Q. 03	(a) A straight line makes angles of measure $\alpha, \beta, \lambda, \delta$ with four diagonal of cube prove that: $\cos^2(\alpha) + \cos^2(\beta) + \cos^2(\lambda) + \cos^2(\delta) = \frac{4}{3}$	3	C5	2	06
	(b) Find the rectangular coordinates of the point whose spherical coordinates are given below: (i) $(5, \frac{\pi}{2}, \frac{\pi}{2})$ (ii) $(4, \frac{\pi}{3}, \frac{2\pi}{3})$ (iii) $(0, \frac{\pi}{11}, \frac{\pi}{5})$	3	C1	2	06
Q. 04	(a) Define sphere, center of sphere, radius of sphere and also derive the equation of sphere in standard form.	3	C1	3	06
	(b) Find an equation of sphere which passes through the points A(-3, 6, 0), B(-2, -5, -1) and (1, 4, 2) and whose centre lies on the hypotenuse of the right-angled triangle ABC.	3	C1	3	06
Q. 05	(a) Let the region D be bounded by the parabola $x^2 + 9y = 36$ and the straight line $2x + 3y = 12$ evaluate: $\iint_D x^2 y dy dx$	3	C5	3	06
	(b) Find the volume of the tetrahedron enclosed by the plane $x + 2y + z = 2$ and the coordinate planes.	3	C1	3	06



**SUBJECT: WATER SUPPLY & TREATMENT ENGINEERING****Dated: 23.05.2022****Maximum Marks: 60****Time Allowed: 3 Hours****NOTE: ATTEMPT ALL QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.**

Q. No.	QUESTION	CLOs	Proficiency Level	POs	Marks
Q.01	What do you understand about water pollution? Summarize the impurities which cause water pollution. Describe physical characteristics of water.	1	C2	1	12
Q.02 (a)	Sedimentation is one of the most significant processes in the treatment of water? Discuss the importance of detention time, overflow rate, and settling velocity of rectangular sedimentation tanks.	2	C5	2	07
(b)	Design a plain sedimentation tank to serve one lakh population at 150 liters/head/day. Take a factor of safety 1.5, detention time of 4.0 hours and overflow rate of 20,000 liters/day/m <sup>2</sup> .	2	C5	2	05
Q.03 (a)	State the term coagulation? Why chemical coagulation is performed in water treatment systems?	2	C5	2	07
(b)	Determine the requirements of alum and lime to treat water 10 <sup>7</sup> liters/day at alum dosage of 30 mg/liter when original alkalinity present is 8.5 mg/liter.	2	C5	2	05
Q.04 (a)	Discuss the significance of water filtration used in water supply systems? Mention the criteria applicable for classification of water filters.	2	C5	2	07
(b)	Determine the size of a rapid sand filter unit for filtering 0.15 ML/hour of water.	2	C5	2	05
Q.05 (a)	How disinfection can be explained? Discuss the residual chlorine, combined residual, break point and free residual chlorine with the help of diagram.	3	P3	4	07
(b)	Calculate the amount of bleaching powder required to treat 10 <sup>7</sup> liters per day of water with a chlorine dosage of 0.8 mg/liter and assume that the available chlorine is 40%.	3	P3	4	05

**The End**