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

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2023 OF 20-BATCH, B.E (ME)

SUBJECT: FLUID MECHANICS-II

ated: 12.06.2023 Maximum Marks: 60 Time Allowed: 3 Hours

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

Q. NO.	QUESTIONS	CLO	MARKS
1 (a)	How hydropower plant is known to be renewable and sustainable source of energy briefly discuss? Also enlist all types of hydraulic Turbine with flow chart.	1	05
1 (b)	The impeller of centrifugal pump has an external diameter of 450 mm and internal diameter of 200 mm and it runs at 1440 rpm. Assuming a constant radial flow through the impeller at 2.5 m/s and that the vanes at exit are set back at an angle 25°, determine (i) inlet vane angle (ii) The absolute angle, velocity of water at exit makes with the tangent (iii) The work done per unit weight of water.	3	07
2 (a)	What do you know about hydrologic cycle and hydrograph in water power development, and discuss the safety measures in hydroelectric power plant?	1	05
2 (b)	An accumulator has a ram of 200mm diameter and a lift of 6m. if the liquid is supplied at a pressure of 40 bar, Find (i) Load on the ram (ii) Capacity of the accumulator.	3	07
3 (a)	Find an equation of discharge, work done and Power required to Drive the single as well as double acting reciprocating pump.	2	05
3 (b)	A single acting reciprocating pump running at 50 rpm delivers 0.00736m^3/s of water. The diameter of the piston is 200mm and stroke length 300mm. the suction and delivery head are 3.5 m and 11.5 m respectively. Determine (i) Theoretical discharge (ii) Co-efficient of Discharge (iii) Percentage slip of the pump (iv) Power required to run the pump.	3	07
4 (a)	Derive the design parameters of Francis turbine runner with neat figure.	2	05
4 (b)	Calculate the diameter and speed of the runner of a Kaplan turbine developing 6000kw under an effective head of 5m. Overall efficiency of the turbine is 90%. The diameter of the boss is 0.4 times the external diameter of the runner. The turbine speed ratio is 2.0 and flow ratio 0.6. Find the specific speed of the turbine.	3	07
5 (a)	Discuss the role of Cavitation with NPSH in centrifugal pump through flow diagram?	1	05
5 (b)	Find the height from the water surface at which a centrifugal pump may be installed in the following case to avoid cavitation: Atmospheric pressure = 2.02 bar, inlet and outlet losses in suction pipe = 3.42m, effective head of the pump = 51m and cavitation parameter = 0.225.	3	07

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

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR 2023 OF 20 BATCH, B.E (ME)

SUBJECT: RENEWABLE AND EMERGING ENERGY TECHNOLOGIES

Dated: 15.06.2023 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	How is solar energy used to generate electricity? What are the advantages and disadvantages of solar photovoltaic (PV) systems? How can solar energy help address the energy crisis in Pakistan?	2	2	3	10
Q. 02	What are the main components of a wind turbine? Can you provide a description of each component and explain their functions? Also, could you calculate the maximum rotor efficiency using Betz's Law?	3	3	7	10
Q. 03	Explain the basic principles of electrolysis. Discuss the important uses of electrolysis in fuel cell technology. Describe the different components of a fuel cell and explain their functions.	2	3	3	10

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

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER–THIRD YEAR OF 20 BATCH, B.E (ME)

SUBJECT: ENGINEERING MANAGEMENT AND ECONOMICS

Dated: 8.6.2023 Maximum Marks: 30 Time Allowed: 2 Hour.

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

Q #	Question	Marks	CLO	Taxonomy Level
Q.01	What type of material handling devices are to be used in small industry, thermal power plant, big automobile repair shop, big steel plant, cement factory?	10	1	2
Q.02	Find EOQ= $\sqrt{(2PU)/C}$, reorder point when lead time is expressed in months and weeks.	10	2	4
Q.03	Enlist depreciation methods. Calculate the depreciation charge of a cutting tool, if first cost is 200 $ and salvage value is 50 $ and if it can remove 50 mm³ of metal in its life.	10	3	5

Good Luck

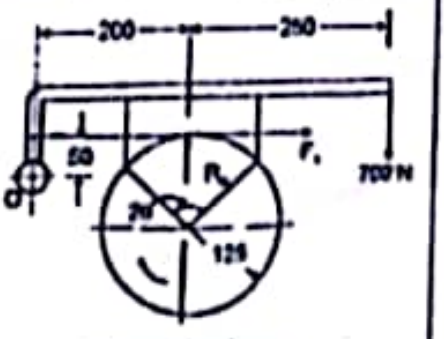
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2021 OF 20 BATCH, B.E (ME)

SUBJECT: MACHINE DESIGN AND CAD-I

Dated: 29.05.2023 Maximum Marks: 30 Time Allowed: 02 Hours

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

		Marks	CLO	Taxonomy Level
Q #1(a)	To comprehend the essential objectives associated with "Machine Design," one must determine its key intents. Additionally, it is essential to construct a flow chart illustrating the sequential steps required to execute the design process for mechanical components.	05	01	05
Q #1(b)	Design a helical compression spring for a maximum load of 1100 N for a deflection of 30 mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420Mpa, and the modulus of rigidity is (222 + Your Roll No) kN/mm².	05		
Q #2(a)	What is your understanding of the concept of a welded joint and how does it differ from a riveted joint?	05	02	04
Q#2(b)	A plate 100 mm wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to a load of (25 + Your Roll No) kN. Find the length of the weld, thus the maximum stress does not exceed 56 MPa. Consider the joint first under static loading and then under fatigue loading.	05		
Q #3(a)	Explain the design considerations and factors involved in the design of a brake mechanism in machine design.	05	02	03
Q #3(b)	A single block brake having diameter of drum is 250mmand, and the angle of contact is 90°, as shown in figure 3b, if the operating force of 700N is applied at the end of a lever and the coefficient of friction between the drum and the lining is0.35, Determine the torque that may be transmitted by the block brake?  All Dimensions in mm	05		

The End

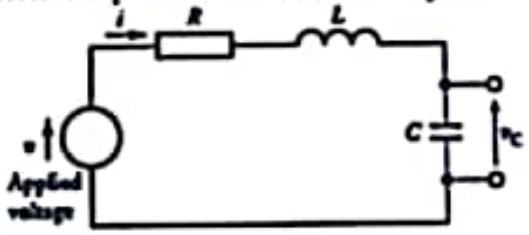
QUAID-E-AWAM UNIVERSITY OF ENGINEERING, SCIENCE & TECHNOLOGY, NAWABSHAH

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR, 2023 OF 20-BATCH, B.E (ME)

SUBJECT: INSTRUMENTATION AND CONTROL

Dated: 01.06.2023 Maximum Marks: 30 Time Allowed: 02 Hours.

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

Q. No.		QUESTION	CLO	Taxonomy Level	Marks
Q. 01	(a)	What is Hot wire anemometer? Differentiate Constant Temperature (CT) and Constant Current or (CC) anemometer.	2	3	05
	(b)	A hot wire operates at a temperature of 200°C while the air temperature is 20°C. The velocity of air may vary between 0 and 10m/s. The hot wire element is a platinum wire of 4μm diameter and 1.2mm length. What is the sensor output when the air velocity is 4m/s? Considering the electrical resistivity of Platinum at 20°C as $\rho_{20} = 10.5 \times 10^{-8}/°C$. We also assume a value of $\alpha = 0.00385/°C$ as the temperature coefficient of Platinum. Further, we assume that the resistivity of Platinum varies linearly according to the relation $\rho_t = \rho_{20}[1 + \alpha(t - 20)]$.	2	4	05
Q. 02	(a)	What is building block. Discuss the basic system models of transitional and rotational mechanical system.	2	3	05
	(b)	Consider a simple electrical system consisting of a resistor–inductor–capacitor system as shown in figure Applying Kirchhoff's second law to the circuit loop and develop second order differential equation of electrical system. 	2	3	05
Q. 03	(a)	What is transfer functions. Discuss the importance of transfer function in control system.	2	4	05
	(b)	Determine the response of the system when subject to a step input of size 100°C and hence the time taken to reach 95% of the steady-state value. Consider a thermocouple which has a transfer function linking its voltage output V and temperature input as $$G(s) = \frac{30 \times 10^{-6}}{10s + 1} V/°C$$	2	4	05

The End

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

FINAL SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER – THIRD YEAR 2023 OF 20 BATCH, B.E (ME)

SUBJECT: STATISTICS & PROBABILITY

Dated: 05.06.2023 Maximum Marks: 60 Time Allowed: 3 Hours.

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

Q. No.		QUESTION	CLO	Taxonomy Level	PLO	Marks
Q. 01	(a)	Estimate the mean deviation and variance of the following frequency distribution showing the weights of item. Weight(grams): 65-84 | 85-104 | 105-124 | 125-144 | 145-164 | 165-184 | 185-204 Frequency(f): 9 | 10 | 17 | 10 | 5 | 4 | 5	2	C5	2	09
	(b)	Examine the standard deviation of Q.01(a).	2	C4	2	03
Q. 02	(a)	An employer wishes to hire three people from a group of 15 applicants , 8 men and 7 women , all of whom are equally qualified the position. If he selects the three at random, what is the probability that (i) all three will be men, (ii) at least will be a woman.	3	C1	3	08
	(b)	An integer is chosen at random from the first 200 positive integers. Examine the probability that the integer chosen is divisible by 6 or by 8?	3	C4	3	04
Q. 03	(a)	In a bolt factory, machines A, B and C manufacture 25, 35 and 40 percent of the total output, respectively . Of their outputs, 5, 4, 2 percent, respectively , are bolt defective bolts. A bolt is selected at random and found to be defective. What is the probability that the bolt came from machine, (i) A ?, (ii) B ?, (iii) C ?	3	C1	3	06
	(b)	The probability that a man will be alive in 25 years is 3/5, and the probability that his wife will be alive in 25 years is 2/3. Discuss the probability that (i) both will be alive, (ii) only man will be alive (iii) at least one be alive.	3	C6	3	06
Q. 04	(a)	Find the probability distribution and distribution function for the number of head when 3 balanced coins are tossed. Construct a graph of the distribution.	3	C1	3	08
	(b)	A random variable X is of continuous type with probability distribution function $f(x) = 2x, 0 < x < 1$ $f(x) = 0$, *elsewhere* Determine $P\left(X = \frac{1}{2}\right)$ and $P\left(X \leq \frac{1}{2}\right)$.	3	C5	3	04
Q. 05		(I) Find the value of k so that the function $f(x)$ defined as follows, may be a density function $f(x) = kx, 0 \leq x \leq 2$ $f(x) = 0$, *elsewhere* (II) Find also the probability that both of two sample values will exceed 1. (III) Compute the distribution function $F(x)$.	3	C1	3	12

The End

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

MID SEMESTER REGULAR EXAMINATION OF FIRST SEMESTER-THIRD YEAR OF 20-BATCH, B.E (ME)

SUBJECT: ENGINEERING MANAGEMENT AND ECONOMICS

Dated: 10.3.2023 Maximum Marks: 10 Time Allowed: 45 Minutes.

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

Q#	Question	Marks	C
Q.01	The efficiency of production depends on how well the various machines; production facilities and employee's amenities are located in a plant. Explain four types of plant layout used in case of manufacturing production.	05	
Q.02	Enlist main contributors to productivity improvement. Analysis productivity individually and collectively of the data collected of local based company situated at Nawabshah as given, Misc Input = 600, Energy Input = 1200, Capital Input = 4000, Material Input = 3000, Human Input = 4000, Output = 20,000	05	2
Q.03	Explain management functions and its importance to deal with the "politics" in a work place.	05	1

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

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.E (ME)

SUBJECT: RENEWABLE AND EMERGING ENERGY TECHNOLOGIES

Dated: 14-03-2023 Maximum Marks: 10 Time Allowed: 45 Minutes.

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

	QUESTION	Marks	CLO
Q. 01	Explain the off-grid and on-grid applications of Solar Photovoltaic (PV) and assess the potential of Solar PV in Pakistan.	05	1
Q. 02	Analyze the factors those impact the efficiency of a solar cell and construct a table outlining the advantages and disadvantages of solar PV.	05	1
Q. 03	Evaluate Pakistan's current primary energy mix and electricity generation mix. Discuss the significance of renewable energy sources in addressing the prevailing energy crisis in Pakistan.	05	1

The End

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

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.E (ME)

SUBJECT: INSTRUMENTATION AND CONTROL

Dated: 08.03.2023 Maximum Marks: 10 Time Allowed: 45 Minutes.

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

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Q. No.		Question	CLOs	Taxonomy Level
Q. 01	(a)	What is Hot wire anemometer? Differentiate Constant Temperature (CT) and Constant Current or (CC) anemometer.	1	3
	(b)	A hot wire operates at a temperature of $200°C$ while the air temperature is $20°C$. The velocity of air may vary between 0 and $10m/s$. The hot wire element is a platinum wire of $4\mu m$ diameter and $1.2mm$ length. What is the sensor output when the air velocity is $4m/s$? Considering the electrical resistivity of Platinum at $20°C$ as $\rho_{20} = 10.5 \times 10^{-8}/°C$. We also assume a value of $\alpha = 0.00385/°C$ as the temperature coefficient of Platinum. Further, we assume that the resistivity of Platinum varies linearly according to the relation $\rho_t = \rho_{20}[1 + \alpha(t - 20)]$.	1	4
Q. 02	(a)	Explain the importance of pitot tube in the application moving fluid or body? Describe the working mechanism of pitot tube with its diagram.	1	3
	(b)	A Pitot static tube is used to measure the velocity of an aircraft. If the air temperature and pressure are $5°C$ and $90kPa$ respectively, what is the aircraft velocity in km/h if the differential pressure is $250mm$ water column? However, the density of water in use in manometer is 999.8 kg/m^3, whereas the gas constant is R_g = 287 $J/kg\ K$.	1	4
Q. 03		Write short note any three of the following: 1. Accuracy 2. Precision 3. Range and span 4. Random and Systematic error	1	3

The End

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

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.E (ME)

SUBJECT: MACHINE DESIGN & CAD-I

Dated: 06.03.2023 Maximum Marks: 10 Time Allowed: 45 Minutes.

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

Q. No.	Questions	Marks	CLO	Taxonomy Level
Q.01	What are the main objectives of the subject "Machine Design"? Draw the flow chart of the procedure to follow the design of the mechanical element.	05	01	03
Q. 02	Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420 Mpa, and the modulus of rigidity is (20 + Your Roll No) kN/mm².	05	01	03
Q 03 (a)	What is the difference between aulking and fullering? Illuminate with the help of neat sketches.	03	01	03
Q 03 (b)	Discuss and enlist the various types of power threads with at least two practical applications for each type, also, enlist their relative advantages and disadvantages	02		

The End

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

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.E (ME)

SUBJECT: FLUID MECHANICS II

Dated: 13.03.2023 Maximum Marks: 20 Time Allowed: 1 HOURS.

NOTE: ATTEMPT ANY TWO (02) QUESTIONS, QUESTION ONE (01) IS COMPULSORY. ALL QUESTIONS CARRY EQUAL MARKS.

Q. No.	QUESTION	CLOs	Marks
Q. 01	Find an Expression of hydrodynamics force , work done/s, work done per unit weight of water and hydraulic efficiency formula for a single vane when jet striking a moving curved vane tangentially at on tip and leaving another with velocity flow triangles diagram.	2	10
Q. 02	A small ship is fitted with jets of total area 0.85m². The velocity through the jet is 7m/s and the speed of the ship is 15km/h in sea water. The efficiencies of the engine and pump are 85% and 65% respectively. If the water is taken amidships, Determine (a) Propelling force (b) Overall efficiency	3	10
Q. 03	A single jet Pelton wheel turbine is required to drive a generator to develop 10000kw. The available head on the turbine is 760m. Assume electric generator efficiency 95%, Pelton wheel efficiency 87%, coefficient of velocity for nozzle 0.97, mean bucket velocity 0.46 of jet velocity, outlet angle of bucket 15 degree and the relative velocity of the water leaving the buckets 0.85 of that inlet. Find (a) The flow in m³/s (b) The diameter of jet (c) The force exerted by the jet on the buckets (d) The best synchronous speed for generator at 50 Hz and the corresponding mean diameter, if the ratio of the mean diameter to jet diameter is not to be less than 10.	3	10

Good Luck

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

MID-SEMESTER EXAMINATION OF FIRST SEMESTER – THIRD YEAR (5TH SEMESTER) 2023, 20-BATCH, B.E (ME)

SUBJECT: STATISTICS & PROBABILITY

Dated: 09.03.2023 Maximum Marks: 20 Time Allowed: 01 Hours.

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

<table>
<tr><th>Q. No.</th><th>QUESTION</th><th>CLOs</th><th>Taxonomy Level</th><th>PLOs</th><th>Marks</th></tr>
<tr><td>Q. 01</td><td>A Sample of 40 large cities was selected, and the average of the wind speeds was computed for each city over one year. Construct a frequency distribution using 7 classes.
12.5 9.1 11.2 9.0 10.5 8.2 8.9 12.2
9.5 10.2 7.1 11.0 6.2 7.9 8.7 8.4
8.9 8.8 7.1 10.1 8.7 10.5 10.2 10.7
7.9 8.3 8.7 8.7 10.4 7.7 12.3 10.7
7.7 7.8 11.8 10.5 9.6 9.6 8.6 10.3</td><td>1</td><td>C3</td><td>2</td><td>10</td></tr>
<tr><td>Q. 02</td><td>Use the following data to construct, Frequency polygon and ogive of relative frequency.
<table><tr><th>Class interval</th><th>frequency</th></tr><tr><td>22 - 24</td><td>1</td></tr><tr><td>25 - 27</td><td>2</td></tr><tr><td>28 - 30</td><td>10</td></tr><tr><td>31 - 33</td><td>6</td></tr><tr><td>34 - 36</td><td>5</td></tr><tr><td>37 - 39</td><td>4</td></tr><tr><td>40 - 42</td><td>2</td></tr></table></td><td>1</td><td>C3</td><td>2</td><td>10</td></tr>
<tr><td>Q. 03</td><td>Use the data of Q.02 to find the following:
(I) Arithmetic mean by shortcut method.
(II) Geometric mean by logarithmic method.</td><td>1</td><td>C1</td><td>2</td><td>10</td></tr>
</table>

Good Luck