4E1308

Roll No. _____ Total No. of Pages: 4

4E1308

B. Tech. IV - Sem. (Main) Exam., - 2022

Automobile Engineering

4AE2 – 01 Data Analytics

AE, ME, PT

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Why it is important to screening the data prior to analysis task?

Q.2 What do you understand about technique "Use a global constant to fill in the missing value"?

Q.3 Differentiate between classification and numeric prediction.

Q.4 What are the terminating conditions for stopping the partitioning in decision tree induction algorithm?

Q.5 Give use of attribute selection measures in Decision tree.

Q.6 Write any 4 requirements of clustering.

Q.7 What is the need of dimensionality reduction of a dataset?

Q.8 Define principle components in PCA.

Q.9 What is dissimilarity Matrix in Clustering?

Q.10 Why sigmoid function is used in logistic regression?

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 What is the use of Confusion Matrix? Define all the related terms of a Confusion Matrix.

Q.2 What is Linear Regression? How it is differ from Logistic regression?

Q.3 Give working Convergence Conditions, weakness and strength of K – means clustering algorithm.

Q.4 What do you understand by over fitting in classification? Give solutions for it.

Q.5 Compare simple discriminant analysis and multiple discriminant analysis.

Q.6 What is the use of variance? Give the basic properties of the standard deviation, ∂ as a measure of spread.

Q.7 Write important steps of ARIMA model for time series data analysis.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 What is multivariate analysis? Explain the following multivariate analysis techniques by taking any suitable examples –

(a) Multiple Logistic Regression

(b) Multivariate analysis of variance (MANOVA)

Q.2 Consider the following data set consisting of the scores of two variables on each of seven individuals –

Subject	A	B
1	1.0	1.0
2	1.5	2.0
3	3.0	4.0
4	5.0	7.0
5	3.5	5.0
6	4.5	5.0
7	3.5	4.5

K = 2, and distance measures is Euclidean distance. Find the final allocation in each cluster and centroid using K – means clustering algorithm.

Q.3 Explain the conjoint analysis by showing all necessary steps.

Q.4 Use single and complete link agglomerative clustering to group the data described by the following distance matrix. Show all the steps and construct dendrogram.

	A	B	C	D
A	0	1	4	5
B		0	2	6
C			0	3
D				0

Q.5 Write short notes on the following –

(a) Hierarchical Regression

(b) PCA

(c) Various Matrix and methods for assessment of classifier performance

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4E1309

Roll No. _____ Total No. of Pages: 3

4E1309

B. Tech. IV - Sem. (Main) Exam., - 2022

Automobile Engineering

4AE3-04 Digital Electronics

AE, ME

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 Draw the VI characteristic of an ideal diode.

Q.2 State Mass – action law and give its equation.

Q.3 What is Hall Effect?

Q.4 Define slew rate and SVRR.

Q.5 Design a NOT gate using two input Ex – OR gate.

Q.6 Simplify following Boolean expression –

$$(P + \overline{Q})\,(P\overline{Q} + PR)\,(\overline{P}\,\overline{R} + \overline{Q})$$

Q.7 What is the 11's compliment of $(935)_{12}$.

Q.8 State Barkhausen's criteria for oscillation.

Q.9 What is the need of modulation?

Q.10 What is the difference between positive and negative feedback?

PART – B

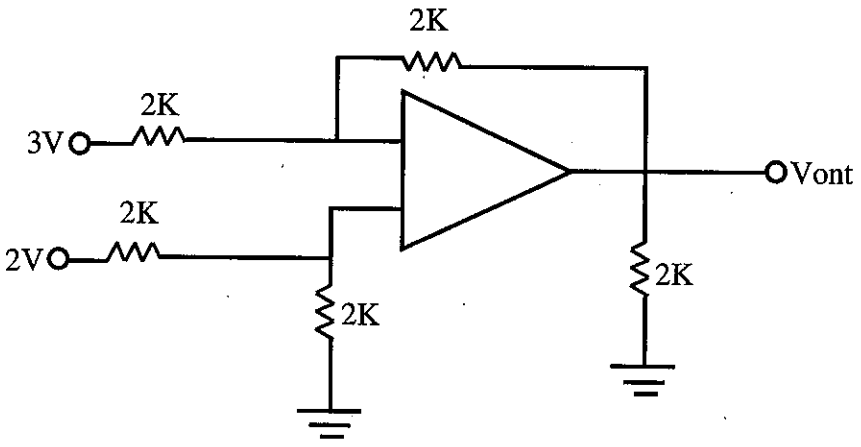
(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Draw & explain the V – I characteristic of P – N diode. Also explain the dependence of V-I characteristic on temperature with suitable equation.

Q.2 Draw the circuit of transistor in common emitter configuration & sketch the output characteristic, mention cutoff, active and saturation region also.

Q.3 Calculate the output voltage for circuit shown below –



Figure–1

Q.4 Draw the circuit diagram for an integrator and also explain its working.

Q.5 Implement the following Boolean function with only one 4.1 multiplexer -

$F(A, B, C) = \sum (1, 3, 5, 7)$

Q.6 State the difference between latch and flip flop using suitable diagram.

Q.7 Minimize $F(x, y, z) = \sum (0, 2, 3, 4, 6) + d(1, 5)$ using K Map

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Design the full adder circuit using NAND gate.

Q.2 Design the regulated power supply of ± 5V using filters and three terminal voltage regulated IC. Also mention the capacitor value for filtering.

Q.3 What are the various operating modes of SSS IC? Explain the working principle of froe running multivibrator also.

Q.4 Draw an asynchronous 4 – bit up down counter and also explain its working.

Q.5 Write short note on following –

(a) AM & FM modulation schemes

(b) IEEE frequency spectrum

4E1310

Roll No. _____ Total No. of Pages: 3

4E1310

B. Tech. IV - Sem. (Main) Exam., - 2022

Automobile Engineering

4AE4-05 Fluid Mechanics and Fluid Machines

AE, ME

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What are the different properties of liquid?

Q.2 Define Newtonian and Non – Newtonian fluids.

Q.3 What is a manometer? How are manometers classified?

Q.4 Explain the terms metacenter and metacentric height.

Q.5 State Buckingham's π - theorem.

Q.6 Explain the terms coefficient of contraction, coefficient of velocity and coefficient of discharge.

Q.7 Define the terms hydraulic efficiency, mechanical efficiency.

Q.8 Define the terms: Suction head, delivery head and manometric head.

Q.9 State the Pascal's law.

Q.10 What do you understand by center pressure?

PART – B

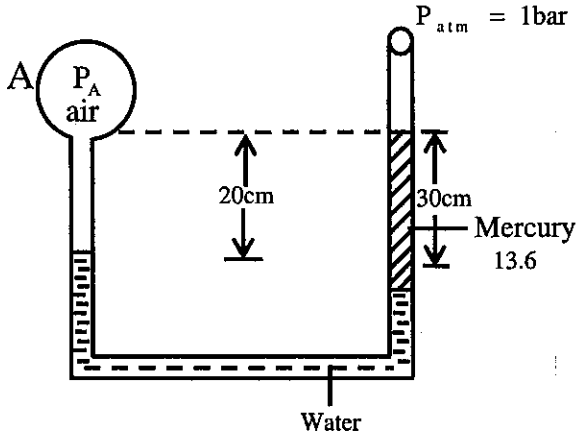
(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 A plate 0.5mm distance from a fixed plate moves at 0.25m/s and requires a force per unit area of 2.0 N/m^2 maintain this speed. Determine the viscosity of the fluid between the plates.

Q.2 Derive an expression for the pressure within a droplet of water.

Q.3 In the manometer shown in figure, find the pressure P_A of the air inside bulb A.



Q.4 Derive an expression for the hydrostatic pressure on an inclined surface immersed in a liquid.

Q.5 A stone weighs 500 N in air and 200 N in meter. Determine the volume of stone and its specific gravity.

Q.6 A pump delivers 0.02 m^3/s against head of 16m with a rotational speed of 1750 rpm. Find the specific speed.

Q.7 A turbine develops 5000 kW when running at 80 rpm. The head in the turbine is 20m. If the head on the turbine is increased to 30m, determine the speed and power developed by the turbine.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Derive an expression for the depth of center of pressure of vertical surface immersed in a liquid.

Q.2 Derive an expression for the metacentric height of a floating body.

Q.3 State and prove Bernoulli's theorem for flow liquids.

Q.4 Define the term specific speed of a centrifugal pump and deduce an expression for it in terms of the head H, discharge Q and speed N.

Q.5 Find an expression for the head lost due to friction in suction and delivery pipes in a reciprocating pump.

4E1311

Roll No. _____ Total No. of Pages: 2

4E1311

B. Tech. IV - Sem. (Main) Exam., - 2022

Automobile Engineering

4AE4 – 06 Manufacturing Process

AE, ME

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 List different types of patterns.

Q.2 Write difference between brazing and soldering.

Q.3 What is meant by core print?

Q.4 What is the principle of Thermit welding?

Q.5 What is flanging?

Q.6 What is the ideal profile of a sprue?

Q.7 Distinguish between piercing and blanking.

Q.8 What do you mean by sintering.

Q.9 What is runner?

Q.10 What is film blowing?

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Explain the properties required for moulding sand.

Q.2 Explain various welding positions with neat sketch.

Q.3 Discuss any four casting defects.

Q.4 Explain about pattern briefly.

Q.5 Illustrate the function of flux in melting metals and alloys.

Q.6 Explain mechanical pulverization process with neat sketch.

Q.7 Explain forward and backward extrusion process

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Discuss the gas welding process and the necessary equipments needed with suitable examples.

Q.2 What are the desirable properties of moulding sand for sand casting? Explain briefly each one.

Q.3 Explain Electrolytic Process with the help of suitable diagram.

Q.4 Discuss the advantages and limitations of hot working and cold working.

Q.5 Describe the process of extrusion of plastics. Name some products made by this process.

4E1312

Roll No. _____ Total No. of Pages: 2

4E1312

B. Tech. IV - Sem. (Main) Exam., - 2022

Automobile Engineering

4AE4 – 07 Theory of Machines

AE, ME

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 What are the some important inversions of four chain mechanism?

Q.2 What is balancing?

Q.3 Classify types of belts.

Q.4 Define pressure angle.

Q.5 What is dry friction?

Q.6 Define constrained motion.

Q.7 What is resistant body?

Q.8 What is a cam?

Q.9 What is pressure angle?

Q.10 State law of gearing.

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Classify of kinematic pairs.

Q.2 Explain compound gear train.

Q.3 What is the need of balancing? Explain.

Q.4 Explain epicyclic gear train with suitable example.

Q.5 Describe –

(i) Swaying couple

(ii) Hammer blow

Q.6 List and describe the types of belt drives.

Q.7 Explain quick return mechanism.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Develop the expression for gyroscopic couple.

Q.2 Draw and explain velocity and acceleration curve for different types of cam followers.

Q.3 Derive the conditions for maximum power transmitted by belt drive.

Q.4 Describe with neat sketch –

(i) Rack and pinion gears

(ii) Worm and worm gears

Q.5 Explain Single and multi-plate clutches with near diagram.

4E1302

Roll No. _____ Total No. of Pages: 4

4E1302

B. Tech. IV - Sem. (Main) Exam., - 2022

Computer Science & Engineering (AI)

4CAI1 – 03 Managerial Economics and Financial Accounting

All Branches

Time: 3 Hours **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A. Five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

PART – A

(Answer should be given up to 25 words only) **[10×2=20]**

All questions are compulsory

Q.1 "Managerial economic supports manager to take decision for successful implementation of economic strategies." Comment upon this statement.

Q.2 Define GDP and NNP concepts of national income.

Q.3 What is meant by price elasticity?

Q.4 Elaborate the term circular flow of economy. Who are the main players involve in the circular flow of economy?

Q.5 What are the basic elements of demand and supply?

Q.6 Write the concept of opportunity cost with one example.

Q.7 Define Kinked demand curve and write one reason of price rigidity.

Q.8 Differentiate between deductive and inductive methods of economies.

Q.9 Discuss any two significant uses of cash flow statement.

Q.10 What is meant by debt, liabilities and current assets in accounting?

PART – B

(Analytical/Problem solving questions) **[5×4=20]**

Attempt any five questions (Word limit 100)

Q.1 Define the concept of managerial economics. What are the micro and macro scopes of economics? Explain all in brief.

Q.2 What is Law of demand? Draw the suitable diagram of demand curve and write its determinants.

Q.3 Elaborate the cost and output relations in short run and long run. What is the role of Marginal cost in decisions?

Q.4 How demand forecasting is useful for future decision making? Explain any two methods of demand forecasting.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) **[3×10=30]**

Attempt any three questions

Q.1 Define circular flow of economy with suitable diagram. Which are the current economic problems are facing by nation after pandemic situation (Year 2020 - 2021)?

Q.2 Define the term demand elasticity. What are the various degrees of elasticity? Define each with diagram and example.

Q.3 What is meant by least cost combinations in production function? Elaborate the properties of least cost combinations.

Q.4 Why price is rigid in market? Give reasons. Draw Kinked demand curve and how price and output can be determined under Kinked demand curve.

Q.5 Differentiate between –

(a) Demand curve and Supply curve

(b) Explicit cost and implicit cost

(c) Static economy and Dynamic economy

(d) Monopoly market and Monopolistic market

(e) Cash flow statement and Fund flow statement.

Q.5 Write the stages of production function. How manager can control the inputs in production? Define your answer with suitable table of inputs and diagram.

Q.6 How price, output and profit can be determined in perfect competition? Draw suitable diagram.

Q.7 Sttelio Ltd. presents the following information and you are required to calculate funds from operations –

Profit and Loss Account

	₹		₹
To Operation Expenses	1,00,000	By Gross Profit	2,00,000
To Depreciation	40,000	By Gain on Sale of Plant	20,000
To Loss on sale of Building	10,000		
To Advertising Suspense Account	5,000		
To Discount Allowed	500		
To Discount on issue of Shares written off	500		
To Goodwill written off	12,000		
To Net Profit	52,000		
	2,20,000		2,20,000