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4E1308

4E1308

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.

(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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Roll No. _____

Total No. of Pages: 4

4E1302

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?

What are the basic elements of demand and supply?

Write the concept of opportunity cost with one example.

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

Differentiate between deductive and inductive methods of economies.

Discuss any two significant uses of cash flow statement.

10 What is meant by debt, iiabilities and current assets in accounting?

PART – B

(Analytical/Problem solving questions) [5×4=20]
Attempt any five questions (Word limit 100)

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

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

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

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

.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.

).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

PART – C

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.

Roll No. _____

Total No. of Pages: 3

4E1303

4E1303

4E1303

B. Tech. IV - Sem. (Main) Exam., - 2022
Computer Science & Engineering (AI)
4CAI1 – 02 Technical Communication
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 What is technical communication?

Q.2 Write the forms and aspects of 'Technical communication'?

Q.3 What is the process of technical writing?

Q.4 Define note-making.

Q.5 What are the different discourse markers that can be used?

Q.6 What are the different types of resumes?

).7 Combine the following sentence using an appropriate form of the verb given in the brackets.

   (a)   Man and woman...................................complementary to each other. (is/are)

   (b)   The leader as well as his brothers..............to the same tribe. (belong/belongs)

).8 Mention the characteristics of the Report.

).9 Find the errors in the following –

   (a)   She can to drive.

   (b)   The house isn't enough big

).10 Write short on the following –

   (a)   Conference paper

   (b)   Journal

PART – B

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

Attempt any five questions (Word limit 100)

Q.1 "The more you read, the more you become efficient in speaking a language." Throw light on the connection of reading and speaking and tell how you can develop effective speaking skills.

Q.2 Write in detail about the aspects of technical communication and throw light on the 7C's of effective technical communication.

Q.3 Write about the challenges in the process of technical communication in detail.

Q.4 Elaborate editing strategies to achieve appropriate technical style.

Q.5 Define technical communication and its importance in the life of an engineering professional.

Q.6 Elucidate the structure and format of technical articles.

Q.7 Write notes on the following –

   (a)   Features of a report

   (b)   Sales Letter

PART – C

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

Attempt any three questions

Q.1 Create an email informing a group of people in the workplace about a co-worker of theirs whose management position has been downgraded to a staff position. Be clear, direct and concise in your delivery of the information and your explanation for it. Take into account workplace morale and the ethics of this decision. Your email should be at least 150 words long.

Q.2 Your workplace is deciding how to upgrade the desktop computer systems. Prepare a report comparing three types of brands. Identify what categories you would use to compare all three. Include what graphics might be necessary for this report. Include your final recommendation at the end of the analysis.

Q.3 Write a job application in response to the advertisement for various faculty positions in June 2019 issue of the Hindustan Times to apply for the post of Assistant Professor in Computer Science. Write a detailed resume to be enclosed with it.

Q.4 (a) Discuss the various elements of a formal report.

(b) Write brief notes on the following –

(i) Significance of reports.

(ii) Formal and non-formal reports.

Q.5 With the advancement of technology, technical communication has also evolved and many unethical practices have been adopted by the professionals with a huge loss of reputation and assets. Throw light on the role of ethics and moral values in generating, analyzing and communication of technical information.

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4E1309

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.

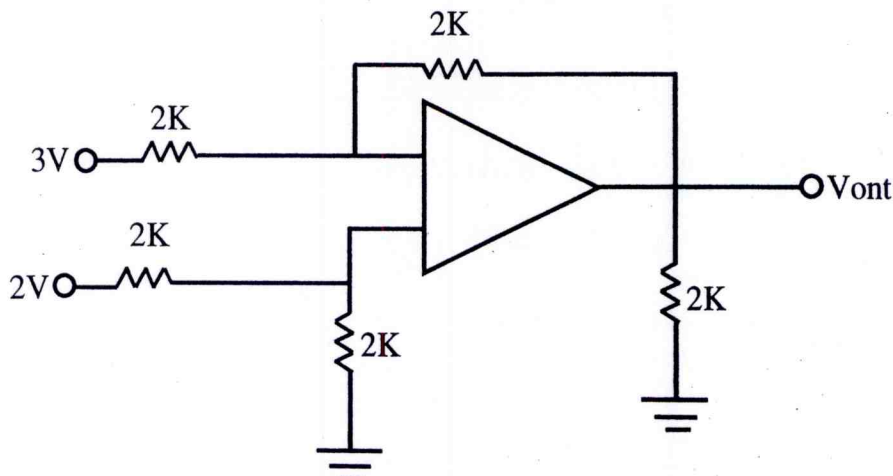Q.3 Calculate the output voltage for circuit shown below –

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 -

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

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

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

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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/m² 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.

P_{atm} = 1bar

A P_A air

20cm

30cm

Mercury 13.6
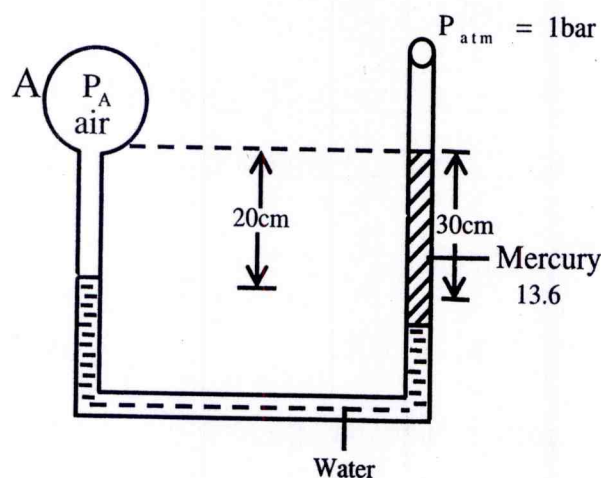
Water

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 m³/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

4E1311

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. <u>NIL</u>   2. <u>NIL</u>

PART – A
<u>(Answer should be given up to 25 words only)</u>   [10×2=20]
<u>All questions are compulsory</u>

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

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
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

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.

Roll No. _____   Total No. of Pages: 2

3E1103

3E1103

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

HSMC Aeronautical Engineering

4AN1-03/ Managerial Economics and Financial Accounting

Common for all branches

Time: 2 Hours   Maximum Marks: 80
                                                   Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three 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. <u>NIL</u>   2. <u>NIL</u>

PART – A

<u>(Answer should be given up to 25 words only)</u>   [5×2=10]

<u>All questions are compulsory</u>

Q.1 Circular flow of economic activity

Q.2 Demand forecasting

Q.3 Define marginal cost

Q.4 Oligopoly marker

Q.5 Capital budgeting

PART – B

(Analytical/Problem solving questions)   [4×10=40]
Attempt any four questions

Q.1 What is Managerial Economic? What are the principles of Managerial Economic?

Q.2 What is National Income and methods of measuring National Income?

Q.3 What is Price Elasticity? Explain types of Price Elasticity of Demand.

Q.4 Discuss the different cost concepts relevant to managerial decision for Planning and Control.

Q.5 Describe the characteristics of Pure/Perfect Competition and Pure Monopoly.

Q.6 What are Financial Ratios? Explain two Financial Ratios in detail.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]
Attempt any two questions

Q.1 What is Law Supply? What are the determinants of Supply? Explain four determinates in detail.

Q.2 State and explain the law of variable proportions.

Q.3 What is Financial Statement Analysis? What are the three basic tools for Financial Statement Analysis?

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4E1233

4E1233

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

Automobile Engineering

4AE4 – 05 Fluid Mechanics and Fluid Machines

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four 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)   [10×3=30]

All questions are compulsory

Q.1   Define displacement thickness, momentum thickness.

Q.2   Explain the terms -

(i)   Meta-centre

(ii)   Centre of buoyancy

(iii)   Metacentric height

Q.3 Explain phenomenon of capillarity.

Q.4 Discuss minor and major losses in pipes.

Q.5 Explain the condition of equilibrium for floating and sub-merged bodies with neat sketches.

Q.6 Define Newtonian and Non Newtonian fluids. State the Newton's law of viscosity.

Q.7 Explain the following terms -

(i) Hydraulic gradient line

(ii) Total energy line

Q.8 The specific speed of a centrifugal pump.

Q.9 What is the function of draft tube?

Q.10 Define the terms - hydraulic machines, turbines and pumps.

PART – B

(Analytical/Problem solving questions)   [5×10=50]

Attempt any five questions

Q.1 Show an expression for the force exacted on the sub merged vertical plane surface by the static liquid and locate the position of centre of pressure.

Q.2 Derive the expression for the velocity distribution for viscous flow through circular pipe and also draw the velocity and shear stress distribution across the section of the pipe.

Q.3 What are the different losses of energy in pipes? Derive Chezy's formula for loss of head due to friction in pipe.

Q.4 The velocity potential function (ϕ) is given by an expression $\phi = -\frac{xy^3}{3} - x^2 + \frac{yx^3}{3} + y^2$

(i) Find the velocity component in x and y direction

(ii) Show that ϕ represents a possible case of flow

Q.5 What is cavitation? How can it be avoided in reaction turbine?

Q.6 Define and explain hydraulic efficiency, mechanical efficiency and overall efficiency of a turbine.

Q.7 How will you obtain an expression for the minimum speed for starting a centrifugal pump?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [4×20=80]
Attempt any four questions

Q.1 With neat sketch derive work done per second for force exerted by jet on moving flat plate.

Q.2 A pelton what is to be designed for a head of 60mm when running at 200rpm? The pelton wheel develops 95 kW shaft power. The velocity of the bucket is 0.45 times the velocity of jet, overall efficiency is 0.85 and coefficient of the velocity is equal to 0.98.

Q.3 A circular plate 3.0m diameter is immersed in water in such a way that its greatest and least depth below the free surface are 4m and 1.5m respectively. Determine the total pressure on one face of the plate and position of centre of pressure.

[4E1233] Page 3 of 4 [300]

Q.4 (a) State Buckingham's π theorem.

(b) The efficiency n of a fan depends on density δ, dynamic viscosity μ of the fluid, angular velocity ω and diameter D of the rotor and the discharge Q. Express η in terms of dimensionless parameters.

Q.5 (a) What is the difference between model and prototype and how similarity is established between them?

(b) State Froude's model Law.

(c) In the model test of a spillway the discharge and velocity of flow over the model were 2 m³/sec and 1.5 m/sec respectively. Calculate the velocity and discharge over the prototype which is 36 times the model size.

Roll No. _____   Total No. of Pages: 2

4E1234

4E1234

B. Tech. IV - Sem. (Back) Exam., - 2022
PCC Automobile Engineering
4AE4 – 06 Manufacturing Processes
AE, ME

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four 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 Define term "Manufacturing".

Q.2 What are the factors affect weldability?

Q.3 What is pattern allowances? List the types of pattern allowances.

Q.4 Define hot working process.

Q.5 What is the purpose of a core?

Q.6 Define the term shearing in cold working process.

Q.7 Define the term bloom in rolling process.

Q.8 What is meant by "fluxing'?

Q.9 List the limitations of powder metallurgy.

Q.10 Define the term particle size distribution.

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PART – B

Q.1 Write the steps for making a casting by removable pattern sand mould casting.

Q.2 What is impact extrusion? Give its product application.

Q.3 How does grain size in polycrystalline solid affect the strength of solid? What happens to grain size in (i) Forging (ii) Rolling?

Q.4 What are the steps involved in setting up a welding outfits? What is the difference in forehand and backhand welding?

Q.5 Discuss the effects of different shapes and size of powder particles in powder metallurgy processing.

Q.6 What is the function of riser? Write the requirements of a good riser.

Q.7 What is press forging? How does it differ from drop forging?

PART – C

Q.1 With the help of diagrams discuss the following casting methods -
   (a) True – centrifugal casting
   (b) Centrifugal casting

Q.2 Determine the forces in deep drawing.

Q.3 Determine the maximum force required for extruding cylindrical aluminum billet of 25 mm diameter and 50 mm length to a final diameter of 5 mm. σ_y for aluminum = 170 N/mm^2. Also calculate the power loss in friction.

Q.4 Explain the mechanism of metal transfer in MIG/ MAG Welding.

Q.5 Describe the characteristics of metal powders in details.

	Roll No. _____	Total No. of Pages: 4

4E1235

4E1235
B. Tech. IV - Sem. (Back) Exam., - 2022
Automobile Engineering
4AE4 – 07 Theory of Machines

Time: 3 Hours

Maximum Marks: 160
Min. Passing Marks: 56

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four 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)   **[10×3=30]**

All questions are compulsory

Q.1 What is a machine? Giving example, differentiate between a machine and a structure.

Q.2 Explain the terms –

    (1) Kinematic chain and

    (2) Inversion

Q.3 Discuss the three types of instantaneous centre for a mechanism.

Q.4 What do you understand by Angle of friction?

Q.5 What do you understand by "gear train"?

Q.6 Explain briefly –

(a) Swaying corpse and

(b) Hammer blow

Q.7 What is the application of gyroscopic principles to aircrafts?

Q.8 What is the differences between simple, compound and epicyclic gear trains?

Q.9 Define the following terms as applies to cam with neat sketch -

(i) Base circle

(ii) Pitch circle

(iii) Stroke of the follower

Q.10 Define the terms –

(i) Module

(ii) Pressure angle and

(iii) Addendum

PART – B

(Analytical/Problem solving questions)   [5×10=50]

Attempt any five questions

Q.1 State the laws of –

(i) Static friction

(ii) Dynamic friction

(iii) Solid friction and

(iv) Fluid friction

Q.2 Derive an expression for the effort require to raise a load with a screw jack taking friction into consideration.

Q.3 In a crank and slotted lever quick return motion mechanism, the distance between the fixed centres is 240 mm and the length of the driving crank is 120 mm. Find the inclination of the slotted bar with the vertical in the extreme position and the time ratio of cutting stroke to the return stroke. If the length of the slotted bar is 450 mm, find the length of the stroke if the line of stroke passes through the extreme positions of the free end of the lever.

Q.4 What do you understand by gyroscopic couple? Derive for its magnitude.

Q.5 Explain with sketches the different types of cams and followers.

Q.6 Derive an expression for the minimum number of teeth required on the pinion in order to avoid interference in involute gear teeth when it meshes with wheel.

Q.7 A pinion having 30 teeth drives a gear having 80 teeth. The profile of the gears is involute with 20° pressure angle, 12 mm module and 10 mm addendum. Find the length of path of contact, arc of contact and the contact ratio.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [4×20=80]
Attempt any four questions

Q.1 Four masses m_1, m_2, m_3 and m_4 are 200 kg, 300 kg, 240 kg and 260 kg respectively. The corresponding radii of rotation are 0.2 m, 0.15 m, 0.25 m and 0.3 m respectively and the angles between successive masses are 45°, 75° and 135°. Find the position and magnitude of the balance mass requires if its radius of rotation is 0.2 m.

Q.2 Two involute gears of 20° pressure angle are in mesh. The number of teeth on pinion is 20 and the gear ratio is 2. If the pitch expressed in module is 5 mm and the pitch line speed is 1.2 m/sec, assuming addendum as standard and equal to one module find -

(i) The angle turned through by pinion when one pair of teeth is in mesh, and

(ii) The maximum velocity of sliding.

Q.3 In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 rpm clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°.

Q.4 A single plate clutch, with both sides effective, has outer and inner diameters 300 mm and 20 mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1 N/mm². If $\mu = 0.3$, determine the power transmitted by a clutch at a speed 2500 rpm.

Q.5 An effort 1500 N is required to just move a certain body up an inclined plane of angle 120, force acting parallel to the plane. If the angle of inclination is increased to 150, then the effort required is 1720 N. Find the weight of the body and the coefficient of friction.

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4E4143

B. Tech. IV - Sem. (Back) Exam., - 2022
Automobile Engineering
4AE4A Design of Machine Elements - I
AE, ME, PI

Time: 3 Hours   Maximum Marks: 80
                                                Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one** **question** from **each unit.**
All questions carry **equal** marks. Schematic diagrams must be shown wherever
necessary. Any data you feel missing 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. Design Data Book   2. NIL

UNIT- I

Q.1 (a) What do you mean by the term "mechanical properties of material"?   [8]

(b) Discuss the "systematic approach" for the selection of materials in machine
design.   [8]

OR

Q.1 Write short notes on the following –   [16]

(a) Interchangeability

(b) Tolerance

(c) Allowance

(d) Fits

250

UNIT- II

Q.2 (a) What is meant by "stress concentration"? How do you take it into consideration in case of a component subjected to dynamic loading? [8]

(b) Explain, how the factor of safety is determined under steady and varying loading by different methods? [8]

OR

Q.2 Design and draw a cotter joint to support a load varying from 30 KN in compression to 30 KN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically.

Tensile stress = compressive stress = 50 MPa; shear stress = 35 MPa, and crushing stress = 90 MPa. [16]

UNIT- III

Q.3 (a) What is a lever? Explain the principle on which it works. Explain, why are levers usually tapered? [8]

(b) A lever is to be designed for a hoisting winch. Write the procedure for designing the lever for such operation. [8]

OR

Q.3 Design a leaf spring for the following specifications –

Total load = 140 KN; Number of springs supporting the load = 4: maximum number of leaves = 10: span of the spring = 1000 mm: permissible deflection = 80 mm. Take Young's modulus, E = 200 KN/mm^2 and allowable stress in spring material = 600 MPa. [16]

UNIT- IV

Q.4 Find the diameter of a solid steel shaft to transmit 20 KW at 200 r. p. m. The ultimate shear stress for the steel may be taken as 360 MPa and a factor of safety as 8. If a hollow shaft is to be used in place of the solid shaft, find the inside and outside diameter when the ratio of inside and outside diameter is 0.5. [16]

OR

Q.4 (a) How are the keys classified? Draw neat sketch of different types of keys and state their application. [8]

(b) What is a coupling? Discuss the function of a coupling. Give at least three practical applications. [8]

UNIT- V

Q.5 Discuss the significance of the initial tightening load and applied load so far as the bolts are concerned. Explain, which of the above loads must be greater for a properly designed bolted joint and show, how each affects the total load on the bolt? [16]

OR

Q.5 (a) Why are square threads preferable to v – threads for power transmission? [8]

(b) In the design of power screws, on what factors does the thread bearing pressure depend? Explain. [8]