

4E4140

Roll No. _____

Total No of Pages: 4**4E4140****B. Tech. IV Sem. (Main/Back) Exam., June/July-2014****Mechanical Engg.****4ME1A Kinematics of Machines****Common with AE****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.

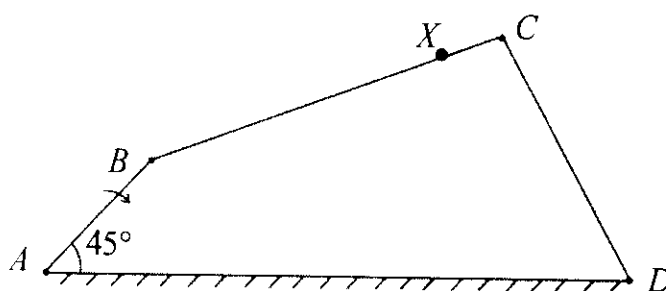
(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

- Q.1. (a) Present a classification of kinematic pairs. [4]
 (b) Draw and describe Oldham coupling. [4]
 (c) Determine velocity of point 'x' on following four bar chain, when crank AB rotates at 600 rpm clockwise. [8]



$$AB = 4cm$$

$$BC = 7cm$$

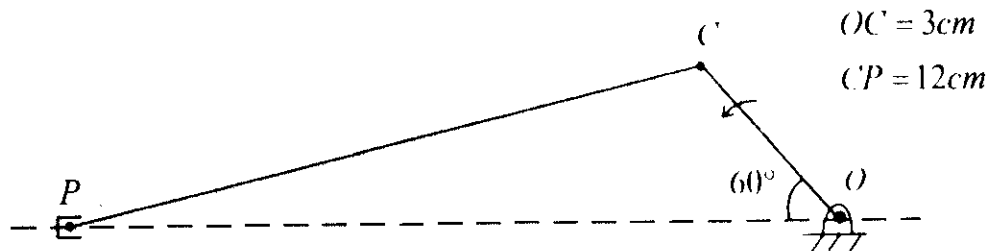
$$CD = 5cm$$

$$DA = 12cm$$

$$CX = 2cm$$

OR

- Q.1. (a) Derive an expression for coriolis acceleration and explain its direction. [8]
- (b) Locate Instantaneous centers and determine velocity of slider for following arrangement. Crank OC rotates at 300 rpm anticlockwise. [8]

**UNIT-II**

- Q.2. (a) With help of a neat sketch, explain working principle of Scott Russel mechanism. [8]
- (b) Describe Hooke's joint and derive an expression for angular velocity ratio of driver and driven shaft. [8]

OR

- Q.2. (a) What is condition for correct steering? Discuss Ackerman steering mechanism with help of a neat sketch. [8]
- (b) Derive an expression for time period of Trifler Suspension. [8]

UNIT III

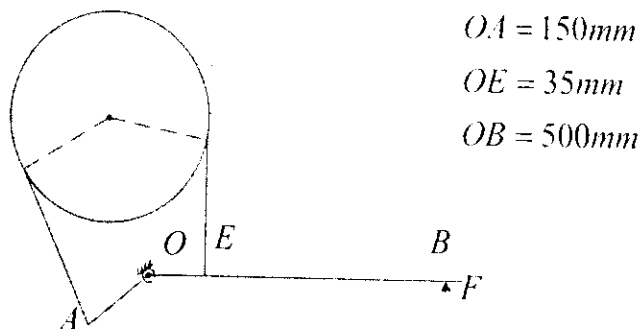
- Q.3. (a) A thrust bearing has contact surface 200 mm external diameter and 150 mm internal diameter. The coefficient of friction is 0.08, the total axial load is 3000 N and maximum uniform intensity of pressure is 0.35 N/mm^2 . Calculate the number of collars required and the power lost in friction at 420 rpm. [8]
- (b) Derive an expression for moving a body up on inclined plane. [8]

OR

- Q.3 (a) A flat belt of $200 \times 12 \text{ mm}^2$ cross section runs between two pulleys. The allowance strength of belt material is 2.5 N/mm^2 . Determine the maximum power that can be transmitted by it if the ratio of tension is 2 and the density of the material of the belt is 1000 kg/m^3 . [8]
- (b) What is the effect of centrifugal tension on power transmission capacity of a belt? [4]
- (c) Discuss chordal action in a chain drive. [4]

UNIT-IV

- Q.4. (a) Derive a formula for ratio of tensions (T_n/T_o) in a Band and Block brake. (8)
- (b) A band brake as shown in figure has an angle of contact 225° and is required to sustain a torque of 350 N-m . The diameter of drum is 350 mm and coefficient of friction is 0.3 . Determine the effort F . For what value of OE the brake is self locking. [8]



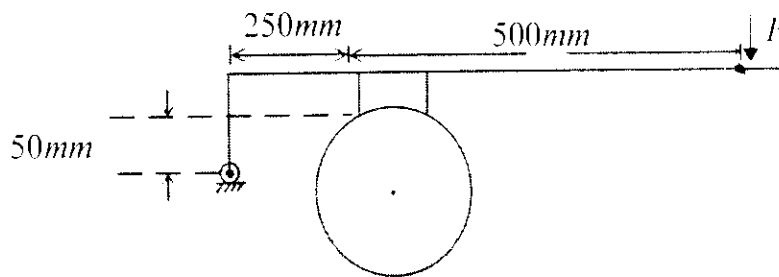
OR

- Q.4. (a) Draw and describe belt transmission dynamometer. [8]

- (b) For a block as shown in figure, the diameter of brake drum is 400 mm and angle of contact is 40° . The applied effort F is 2 kN and coefficient of friction is 0.35. Determine braking torque when drum is rotating.

(i) clockwise and (ii) anticlockwise

[8]



UNIT-V

- Q.5. (a) Describe pressure angle of a cam. Discuss its importance in cam design. [4]

- (b) A cam drives a knife edge follower. During first 90° of rotation the follower moves outward through a distance 30 mm with SHM. The follower dwells for next 90° of rotation. During next 90° the follower moves inward with SHM and then dwells for remaining 90° of cam rotation. Draw cam profile, if base circle radius is 30 mm. [12]

OR

- Q.5. Draw profile of a cam driving a roller follower. For first 120° of cam rotation follower moves upward through a distance of 40 mm with uniform acceleration and then dwells for next 120° . In the last part of cam rotation follower returns to initial position with SHM. Give that base circle radius is 40 mm, draw the cam profile. [16]

4E4141	Roll No. _____	Total No of Pages: 4
<p style="font-weight: bold; font-size: 1.2em;">4E4141</p> <p style="font-weight: bold;">B. Tech. IV Sem. (Main/Back) Exam., June/July-2014</p> <p style="font-weight: bold;">Mechanical Engg.</p> <p style="font-weight: bold;">4ME2A Fluid Mechanics</p> <p style="font-weight: bold;">Common with AE</p>		

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.

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Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

Q.1 (a) Define and explain following fluid properties:

(i) Surface Tension

(ii) Viscosity

(iii) Compressibility

(iv) Vapour Pressure

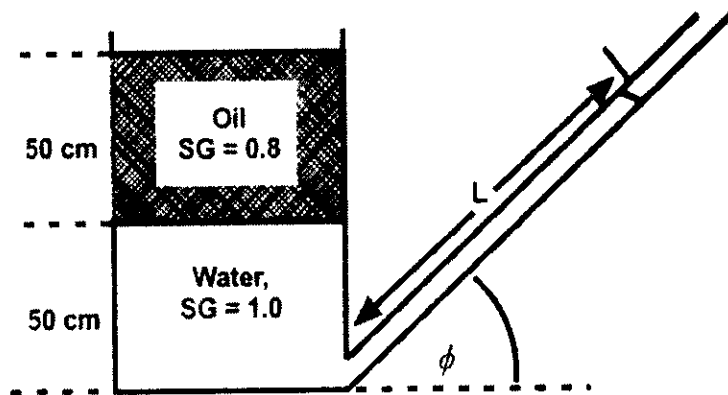
[4×2]

(b) A shaft 6.00 cm in diameter and 40 cm long is pulled steadily at $V = 0.4$ m/s through a sleeve 6.02 cm in diameter. The clearance is filled with oil having

kinematic viscosity = $0.003 \text{ m}^2/\text{s}$ and specific gravity 0.88. Estimate the force required to pull the shaft. [3]

OR

- Q.1 (a) As shown in fig. both the tank and the slanted tube are open to the atmosphere. If $L = 2.13 \text{ m}$, what is the angle of tilt (ϕ) of the tube?

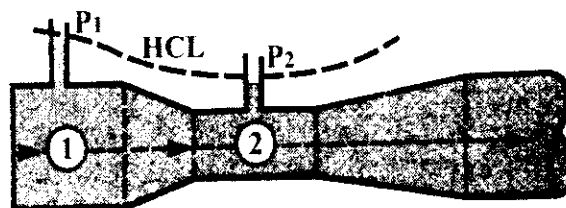


[10]

- (b) Explain the laws of buoyancy given by the Archimedes. [6]

UNIT- II

- Q.2 (a) Explain path line, streak line and streamline. [6]
- (b) A constriction in a pipe will cause the velocity to rise and the pressure to fall at section 2 in the throat. The pressure difference is a measure of the flow rate through the pipe. The smoothly necked-down system is shown in Fig. Find an expression for the mass flux in the tube as a function of the pressure change.



[10]

OR

- Q.2 (a) Explain stream function and velocity potential function. What is their significance? [8]
- (b) Given the eulerian velocity-vector field $V = 3ti + xzj + ty^2k$, find the acceleration of a particle. [8]

UNIT-III

- Q.3 Define Reynolds, Froude's, Mach, Weber and Euler numbers. Explain the application of these numbers. [16]

OR

- Q.3 (a) What is the difference between distorted and undistorted model? Explain. [6]
- (b) At low velocities (laminar flow), the volume flow Q through a small-bore tube is a function only of the tube radius R , the fluid viscosity μ , and the pressure drop per unit tube length dp/dx . Using the pi theorem, find an appropriate dimensionless relationship. [10]

UNIT-IV

- Q.4 (a) Explain prandtl Mixing Length Theory. [8]
- (b) Kerosene at 20°C is pumped at $0.15 \text{ m}^3/\text{s}$ through 20 km of 16-cm-diameter cast iron horizontal pipe. Compute the input power in kW required if the pumps are 85 percent efficient. [8]

OR

- Q.4 (a) What is water hammer? [4]

- (b) The following data were obtained for flow of 20°C water at 20 m³/hr through a badly corroded 5-cm-diameter pipe which slopes downward at an angle of 8°:
 $p_1 = 420 \text{ kpa}$, $z_1 = 12 \text{ m}$, $p_2 = 250 \text{ kpa}$, $z_2 = 3 \text{ m}$. Estimate
- the roughness ratio of the pipe; and
 - the percent change in head loss if the pipe were smooth and the flow rate the same. [12]

UNIT-V

- Q.5 (a) Using Von karman's integral equation, calculate δ/x , δ^*/x and θ/x for the below mentioned sinusoidal profile $\frac{u}{U} \approx \sin\left(\frac{\pi y}{2\delta}\right)$ [16]

OR

- Q.5 (a) What is boundary layer thickness? Explain its significance in analysis of fluid flow problems. [6]
- (b) Write short notes on following:
- Boundary layer separation and control
 - Coefficient of drag and Coefficient lift [5×2]

4E4142	Roll No. _____	Total No of Pages: 3
<p>4E4142</p> <p>B. Tech. IV Sem. (Main/Back) Exam., June/July-2014</p> <p>Mechanical Engg.</p> <p>4ME3A Machining & Machine Tools</p> <p>Common with AE</p>		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

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Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. _____

2. _____

UNIT – I

- Q.1 (a) Explain geometry of single point cutting tool with neat sketches. [8]
- (b) Differentiate between orthogonal and oblique cutting. [4]
- (c) Discuss factors responsible for production of various types of chips. [4]

OR

- Q.1 (a) What is the effect of high cutting temperature on tool and workpiece? Explain how chip-tool interface temperature can be measured. [4+4=8]

- (b) Prove that shear strain

[8]

$$\gamma \Rightarrow \cot \phi + \tan (\phi - \alpha)$$

Where $\phi \Rightarrow$ shear angle &

$\alpha \Rightarrow$ rake angle

UNIT - II

- Q.2 (a) Discuss various factors affecting machinability in detail. [8]
- (b) Explain various mechanism of tool wear. [5]
- (c) Name different types of tool material. [3]

OR

- Q.2 (a) The Taylor tool life equation for machining C-40 steel with a 18:4:1 H.S.S. cutting tool at a feed of 0.2mm/min and a depth of cut of 2mm is given by $VT^n=C$, where n & C are constants. The following V and T observation have been noted

V_1 m/min	25	35
T_1 min	90	20

Calculate

- (i) n and c
- (ii) Hence recommend the cutting speed for a desired tool life of 60 min. [8]
- (b) What is function of cutting fluid during machining? Discuss various types of cutting fluids. [2+6=8]

UNIT – III

- Q.3 (a) Explain any one quick return mechanism of a shaping machine. [8]
- (b) Explain working of a cylindrical grinding machine. [8]

OR

- Q.3 (a) Differentiate between a capstan and a turret lathe machine with suitable sketches. [8]
- (b) Explain tracer attachment in machine tools. [8]

UNIT – IV

- Q.4 (a) Discuss various types of abrasives used for grinding. [8]
- (b) Explain process of manufacturing of a grinding wheel. Why harder wheel is used for soft material and softer wheel for hard material? [5+3=8]

OR

- Q.4 (a) Explain Honing operation and its applications. [8]
- (b) Explain thread milling and thread grinding operations. [8]

UNIT – V

- Q.5 (a) Explain gear shaping process. What are its advantages and limitations? [8]
- (b) Discuss various gear finishing processes. [8]

OR

- Q.5 Explain any two methods. [16]
- (a) Hydraulic forming
- (b) Explosive forming
- (c) Magnetic pulse forming.

4E4143

Roll No. _____

Total No of Pages: **4**

4E4143

**B. Tech. IV Sem. (Main/Back) Exam., June/July-2014
Mechanical Engg.**

**4ME4 Design of Machine Elements-I
Common with AE & PI**

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:-

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(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

Q.1. (a) Discuss factors influencing the selection of materials. [4]

(b) Explain the following:

(i) Standardization

(ii) Inter changeability [6]

(c) A hole is dimensioned as $25^{+0.03}$ mm and the shaft is dimensioned as $25^{-0.02}_{+0.00}$ mm.

What type of fit will be established? Determine the hole tolerance, shaft tolerance and the maximum & minimum allowable of the fit. [6]

OR

- Q.1. (a) Discuss BIS system of designation plain carbon steel and alloy steel giving suitable examples. [4]
- (b) Write note on the following:
- (i) Ergonomic Considerations in Design
 - (ii) Design for Casting
 - (iii) Hole basis system and shaft basis system of tolerance. [12]

UNIT-II

- Q.2. (a) What are the causes of stress concentration? Give suitable diagrams. [6]
- (b) Explain the stages of fatigue failure. [4]
- (c) Give the design equation to calculate the following dimensions of the knuckle joint subjected to load P.
- (i) Pin diameter (d_1)
 - (ii) Thickness of eye-end (t_1)
 - (iii) Outer diameter of eye-end (d_2) [6]

OR

- Q.2. Design a spigot and socket type cotter joint for axial load of 75kN which alternately changes from tensile to compressive. The allowable stresses for the material used are 50MPa in tensions, 40MPa in shear and 100 MPa in crushing. [16]

UNIT-III

- Q.3. One arm of the bell crank lever is 500 mm long and other is 150mm long. A load of 5kN is to be raised acting on a pin at the end of 500 mm arm and the effort is applied at the end of 150mm arm. Lever is made of steel forging, turning at the fulcrum point. For pin and lever the permissible stress is 85 MPa in tension and 70 MPa in shear. Bearing pressure on the pin is not to exceed 10N/mm^2 . Design the lever completely.

[16]

OR

Q.3. A locomotive spring has an overall length of 1.1m and sustains a load of 75kN at its centre. The spring has 3 full length leaves and 15 graduated leaves with a Central band of 100mm wide. All leaves are to be stressed to 420N/mm^2 when fully loaded. The ratio of the spring depth to width is to be approximately 2. Take $E=210\text{ GPa}$. & $P_b=10\text{N/mm}^2$

- (a) Determine the width and thickness of leaves.
- (b) Determine the Nip
- (c) What load is exerted on the band after spring is assembled?
- (d) Eye diameter, using bearing consideration only
- (e) Maximum deflection.

[16]

UNIT-IV

Q.4. A solid steel shaft 1200 mm long is required to transmit 18kw at 600 rpm. A gear 180mm diameter is keyed to the shaft at 300mm to the left of the right hand bearing and driven by another gear from the behind. Another gear of 300 mm dia weighing 500N is mounted on the shaft at 200 mm to the right of the left bearing drives a gear placed directly above it. Pressure angle for both the gear is 20° . The allowable shear stress for shaft material is 70MPa. Determine diameter of the shaft.

[16]

OR

Q.4. Design a protected type CI flange coupling to transmit 9kw at 1500rpm. The maximum torque to be transmitted is 20% greater than mean torque. Allowable shear stress for shaft, bolts and keys is 70 MPa and allowable crushing stress for key is 150MPa. The allowable shear stress for CI flange is 15 MPa.

[16]

UNIT-V

Q.5. A bracket is fixed to column by means of five bolts as shown in Figure 1 to carry a load of 15 kN. Calculated diameter of the bolts required if the allowable shear stress for bolt material is 60MPa. [16]

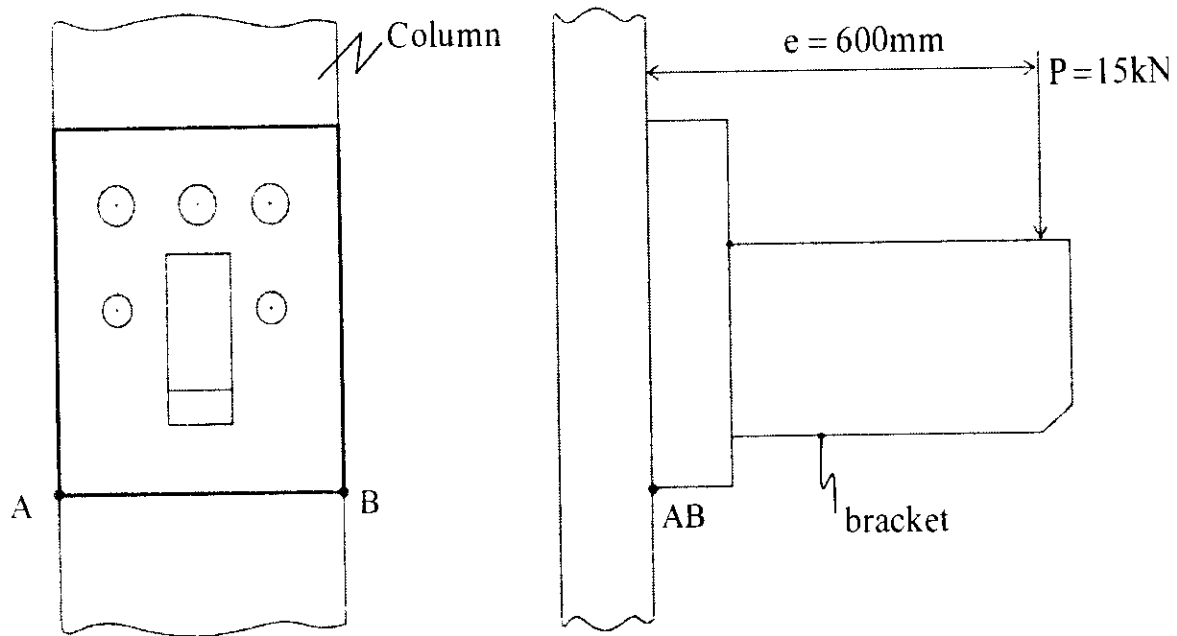


Figure 1

OR

- Q.5. (a) Name the stresses induced in the Threaded portion engaged with nut, initial tightening. [3]
- (b) Why are uniform strength bolts used? Give suitable diagrams of these bolts. [4]
- (c) The cylinder head of a steam engine is subjected to a steam pressure of 0.5 N/mm^2 . It is held in position by means of 12 bolts. The effective diameter of cylinder is 300mm. The stress in the bolt is not to exceed 100MPa. Determine the size of the bolts, considering initial tension for the following cases (a) metal to metal joint (b) a copper gasket ($k=0.5$). [9]

4E4144

Roll No. _____

Total No of Pages: 4**4E4144****B. Tech. IV Sem. (Main) Exam., June/July-2014****Mechanical Engg.****4ME5 Industrial Engineering****Common with AE****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:-**

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(Mentioned in form No.205)

1. _____

2. _____

UNIT-I

Q.1 (a) What contributions to the development of management has been made by:

(i) F. W. Taylor

(ii) H. L. Gantt

(iii) Henri Fayol

[4×3=12]

(b) Discuss briefly the functions of industrial engineering and the role it can play in raising industrial productivity. [4]

OR

- Q.1 (a) Write the basic procedure for carrying out work measurement. [6]
- (b) Following data refers to a work sampling study of a long cycle non repetitive operation.
- Total time of study = 10 days
- Total number of observations = 1200
- Observation of production activity = 900
- Manually controlled elements = 600
- M/C Controlled elements = 300
- Total units produced = 4000 pieces
- Rating index = 110%
- Observations of unavoidable delays = 100
- Assuming that study was made for 6 hrs per day and the industry is running for single shift of 8 hrs/day, calculate the standard time. [10]

UNIT-II

- Q.2 (a) Explain functional organization with its merits, demerits showing organization chart. [8]
- (b) Give detail procedure at forming a joint stock company. [8]

OR

- Q.2 (a) What is the difference between public limited company and private limited company? Explain. [8]
- (b) Discuss the line staff and committee type of organization. Give its utility in large scale industry. [8]

UNIT-III

- Q.3 (a) Name the source of finance for raising fixed capital & describe any three of them in brief. [8]
- (b) Write short note on following:
- (i) Preference share
- (ii) Borrowed capital [4×2=8]

OR

Q.3 Write short note on following (any four)

- (a) Surplus profit
- (b) Profit and loss statement
- (c) Liquidity ratios
- (d) Leverage ratios
- (e) Profitability ratios
- (f) Invisibility ratios

[4×4=16]

UNIT-IV

- Q.4 (a) Machine A operated manually costs Rs. 2000 has a life of 4 years. While Automatic machine B costs Rs. 5000 and has a life of 4 years. Operating cost for machine A is Rs. 4000 per year, while of machine B is Rs. 3000 only. Which should be purchased? Consider 10% interest and use present worth method. [12]
- (b) Explain the concept of "Internal rate of return". [4]

OR

- Q.4 (a) Cost pattern for two machines A & B one shown below (cost in rupees at beginning of the year)

Year	Machine A	Machine B
1	1000	1500
2	600	100
3	900	900

If cost of money is 10% which machine is costly & by how much?

[8]

- (b) Yearly outlay for machine 1, which is to be replaced every 3 years and for machine 2, which is to be replaced every 6 years are given below:

Year	Machine 1 (Rs)	Machine 2 (Rs)
1	1200	1800
2	200	100
3	400	200
4		300
5		400
6		500

If cost of money is 10%, which machine is advantageous & by how much? [8]

UNIT-V

- Q.5 (a) What is the purpose of calculating depreciation? [8]
- (b) What are different methods of calculating depreciation? Explain any two in brief. [8]

OR

- Q.5 (a) Define 'Break Even analysis', Explain following terms:
- (i) Contribution
 - (ii) Margin of safety
 - (iii) Angle of incidence
 - (iv) Profit volume ratio [10]
- Q.5 (b) What are the application, advantage and disadvantage of break even analysis? [6]

4E4145

Roll No. _____

Total No of Pages: 3**4E4145****B. Tech. IV Sem. (Main) Exam., June/July-2014****Mechanical Engg.****4ME6A1.C. Engines****Common with AE****Time: 3 Hours****Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:-**

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(Mentioned in form No.205)

1. _____

2. _____

UNIT – I

Q.1 Write in detail to explain the 5 efficiencies which indicate the performance of an engine. What are their general values? [16]

OR

Q.1 Explain the working of a two stroke, naturally aspirated S.I. engine giving neat sketch. [16]

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UNIT – II

Q.2 (a) Differentiate between:-

- (i) Detonation & knocking
 - (ii) Delay period & Ignition delay
 - (iii) Turbulence & Swirl
 - (iv) Petrol & Diesel injection [8]
- (b) What is meant by knock rating? Explain how Cetane no of a diesel fuel sample is decided. [8]

OR

- Q.2 (a) Write five factors which increase the detonation tendency in an S.I. engine where as they will control knocking in a diesel engine. Give detail explanation. [10]
- (b) Differentiate between an IDI & DI engine. [6]

UNIT – III

Q.3 Explain why rich or lean mixtures are supplied during Idling, Normal running & maximum power range in a spark ignition engine. Give the values of A/F ratios. [16]

OR

- Q.3 (a) Explain the working of an electronic ignition system in an S.I. engine giving a neat sketch. [8]
- (b) Explain the working of a diesel injector giving a neat sketch. Differentiate between petrol & diesel injection. [8]

42/

UNIT – IV

Q.4 (a) What are the functions of lubricating oil? How the lubricating oils are rated. [8]

(b) Give the average temperature ranges of:

(i) Piston

(ii) Exhaust valve

(iii) Spark plug.

How these specific parts are cooled in an engine.

[8]

OR

Q.4 Explain the suitability of SI & CI engines for supercharging. [16]

UNIT – V

Q.5 Differentiate between a dual fuel & multi fuel engine. [16]

OR

Q.5 Explain the suitability of a diesel engine to run on dual fuel. Why the preferred fuel for a diesel engine is natural gas. [16]

4E2054	Roll No. _____	Total No of Pages: 3
<p>4E2054</p> <p>B. Tech. IV Sem. (Back) Exam., June/July-2014</p> <p>Mechanical Engineering</p> <p>4ME6 Mechanical Measurements & Control</p> <p>Common for Mech., Engg. & Automobile Engineering</p>		

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:-

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Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. _____ NIL _____

2. _____ NIL _____

UNIT – I

- Q.1 (a) Derive an expression for the output from the full bridge arrangement of strain gauges. [8]
- (b) What is use at dummy gauge? Explain how do they effect the output of a strain gauge bridge. [8]

OR

- Q.1 (a) Explain active and passive instruments, giving example of each. Discuss the merits of active and passive elements. [8]

- (b) Explain the method of calibration of strain gauges. [8]

UNIT – II

- Q.2 (a) Describe the working principle, construction and method of using an optical pyrometer with the help of neat diagram. [8]
- (b) Explain with neat sketches the working, construction, advantages and disadvantages of resistance thermometer. [8]

OR

- Q.2 What is a thermocouple? Name any two types of thermocouples. Describe with the help of diagram the construction and working of a thermocouple type pyrometer. [16]

UNIT – III

- Q.3 (a) Distinguish between open loop and closed loop control systems with the help of a suitable diagram. Illustrate your answer using block diagram schematics. [8]
- (b) What does signal flow graph represent? Define the various terms associated with it. List and graphically represent the different rules to simplify a given signal flow graph. [8]

OR

- (a) Describe in detail analog and digital data acquisition system. [8]
- (b) Explain the type of software used for data analysis. [8]

UNIT – IV

- Q.4 (a) Derive the transient response of a unit input first order system. [8]
- (b) Specify the time response specifications with the help of a diagram. [8]

OR

Q.4 (a) The forward loop of a unity feedback control system is given by -

$$G(S) = \frac{K}{S(S+6)}$$

Determine the value of K above which the system exhibits oscillatory behavior and obtains the output for K=8 and K=13 for a unit step input. [8]

(b) Discuss the operation of a position control servo mechanism employing dc motor and obtain its transfer function. [8]

UNIT - V

Q.5 (a) The characteristic equation for a certain feedback control system at input $S^4 + 43S^3 + 133S^2 + 36S + K = 0$. Determine the range of value of K for the system to be stable. [8]

(b) Explain absolute and relative stability of a system. Discuss Routh and Hurwitz criterion for stability. [8]

OR

Q.5 (a) Sketch the root locus

$$G(s)H(s) = \frac{K}{S(S+1+j)(S+1-j)} \quad [8]$$

(b) Explain the effect of addition of open loop poles and zeros in root locus and stability. [8]

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<p>4E2050</p> <p>B. Tech. IV Sem. (Back) Exam., June/July-2014</p> <p>Mechanical Engineering</p> <p>4ME2 Automobile Engineering</p>		

Time: 3 Hours

Maximum Marks: 80

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1. _____

2. _____

UNIT-I

Q.1 Describe a hydraulically operated clutch in detail with the help of neat sketch. Also compare it with vacuum and pneumatic methods of operating clutches. [16]

OR

Q.1 (a) Describe the functions and requirements of chassis, frame and bodies. [8]

(b) Starting from front to rear end, briefly describe components attached on the chassis. [8]

UNIT-II

- Q.2 (a) Describe the principle and working of torque converter with its advantages and disadvantages. [8]
- (b) Describe the principle of automatic transmission with neat sketch. Also give its advantages and disadvantages over manual transmission. [8]

OR

- Q.2 (a) Describe the working principle of differential. Why it is necessary in automobile? [8]
- (b) Describe the methods employed in obtaining different gear ratios in a constant mesh gear box. [8]

UNIT-III

- Q.3 (a) Explain the terms: camber, king pin inclination, toe-in, toe-out and castor. Why do we give camber to the tyres initially? [8]
- (b) Explain the construction of a propeller shaft with the help of a neat sketch. [8]

OR

- Q.3 (a) Discuss in detail Davis steering gear & Ackermann steering gear mechanism. [8]
- (b) What do you mean by over steering and under steering? Derive the fundamental equation for correct steering. [8]

UNIT-IV

Q.4 Describe the following two types of ignition systems with the help of neat sketch:-

(i) Magneto Ignition System.

(ii) Coil Ignition System. [16]

OR

Q.4 (a) Write short note on charging and testing of a lead acid battery. [8]

(b) Sketch a layout of lighting circuit suitable for a modern car. Describe all the components. [8]

UNIT-V

Q.5 (a) Explain the working of a GPS. Also give its uses in the field of automobiles. [8]

(b) Describe the working of air bags. How does it contribute to the safety of passenger? [8]

OR

Q.5 (a) Describe the different components of an automobile air conditioning system. [8]

(b) Describe the possible problems occurring in an automobile air conditioning system with their trouble shooting. [8]

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