4E4140

Roll No. ____________

Total No of Pages: 4

4E4140

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016

Automobile Engineering

4AE1A Kinematics of Machines

AE, ME

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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) Sketch and explain the various inversions of a double slider crank chain. [8]

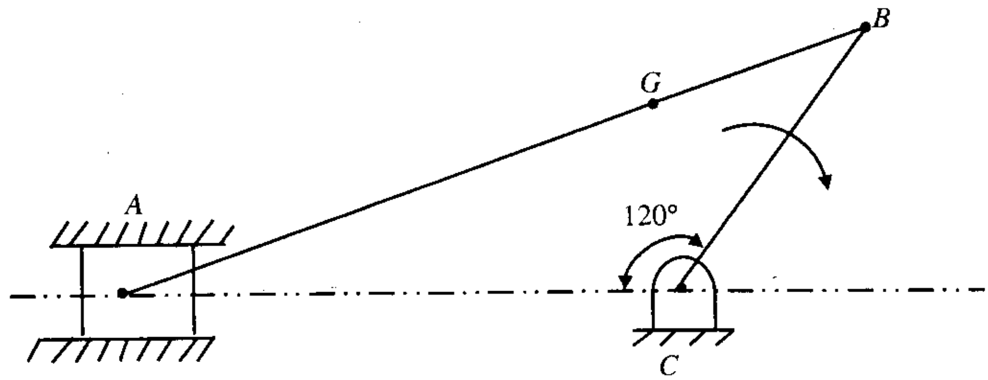
(b) Draw and explain Klien's construction for determining the velocity and acceleration of the piston in a slider crank mechanism. [8]

OR

Q.1 An engine mechanism is shown in figure. The crank CB = 100mm and the connecting rod BA = 300 mm with centre of gravity G, 100 mm from B. The crank shaft has a speed of 75 rad/s and an angular acceleration of 1200rad/s^2. Find: [16]

(i) velocity of G and angular velocity of AB and

(ii) acceleration of G and angular acceleration of AB.



UNIT-II

Q.2 (a) Derive an expression for the ratio of angular velocities of the shafts of a Hooke's joint. Sketch a polar velocity diagram and mark it's salient feature. [8]

(b) What is the fundamental equation of steering gears? Derive the condition of correct steering for Davis steering gear mechanism. [8]

OR

Q.2 (a) Draw and explain an overhead value mechanism of an I.C. Engine. [8]

(b) Two shafts are connected by a universal joint. The driving shaft rotates at a uniform speed of 1200 r.p.m. Determine the greatest permissible angle between the shaft axes so that the total fluctuation of speed does not exceed 100 r.p.m. Also calculate the maximum and minimum speeds of the driven shaft. [8]

UNIT-III

Q.3 (a) What are uniform pressure and uniform wear theories? Deduce expression for the friction torque considering both the theories for a flat collar. [8]

(b) A load of 15kN is raised by means of a screw jack. The mean diameter of the square threaded screw is 42mm and the pitch is 10mm. A force of 120 N is applied at the end of a lever to raise the load. Determine the length of the lever to be used and the mechanical advantage obtained. Is the screw self-locking? Take $\mu = 0.12$. [8]

OR

Q.3 (a) Derive the condition for maximum power transmission by a belt drive considering the effect of centrifugal tension. [8]

(b) Determine the maximum power transmitted by a V-belt drive having the included V – groove angle of 35°. The belt used is 18mm deep with 18mm maximum width and weighs 300 gm. per metre length. The angle of lap is 145° and the maximum permissible stress is $1.5 N/mm^2$ .Take $\mu = 0.2$ [8]

UNIT-IV

Q.4 (a) A single plate clutch transmits 25kw at 900 r.p.m. The maximum pressure intensity between the plates is $85 \ kN/m^2$. The outer diameter of the plate is 360 mm. Both the sides of the plate are effective and the coefficient of friction is 0.25. Determine the (i) inner diameter of the plate (ii) axial force to engage the clutch. [8]

(b) What is a Clutch? Make a sketch of a single plate clutch and describe its working. [8]

OR

Q.4 (a) Show that in a band block brake, the ratio of the maximum and minimum tensions in the brake straps is :

$$\frac{T_0}{T_n} = \left[\frac{1+\mu\tan\theta}{1-\mu\tan\theta}\right]^n$$

Where T_0 = Maximum tension, T_n = Minimum tension 2θ = angle subtended by each block at the centre of the drum. [8]

(b) What is the different between absorption and transmission dynamometers? Describe the construction and operation of a prony brake dynamometer. [8]

UNIT-V

Q.5 (a) How are the cams classified? Describe in detail. [8]

(b) Deduce expression for the velocity and acceleration of the follower when it moves with simple harmonic motion. [8]

OR

Q.5 Draw the profit of a cam operating a knife –edge follower having a lift of 30mm. The cam raises the follower with SHM for 150° of the rotation followed by a period of dwell for 60°. The follower descends for the next 100° rotation of the cam with uniform velocity, again followed by a dwell period. The cam rotates at a uniform velocity of 120 r.p.m, and has a least radius of 20mm. What will be the maximum velocity and acceleration of the follower during the lift and the return. [16]

4E4148

Roll No. ____________ Total No of Pages: 4

4E4148
B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Automobile Engineering
4AE2A Fluid Mechanics & Machines
Common with AE, ME

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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. Moody's Chart 2. ____________

UNIT-I

Q.1 (a) Define and explain following fluid properties: [4×2=8]

(i) Surface Tension

(ii) Viscosity

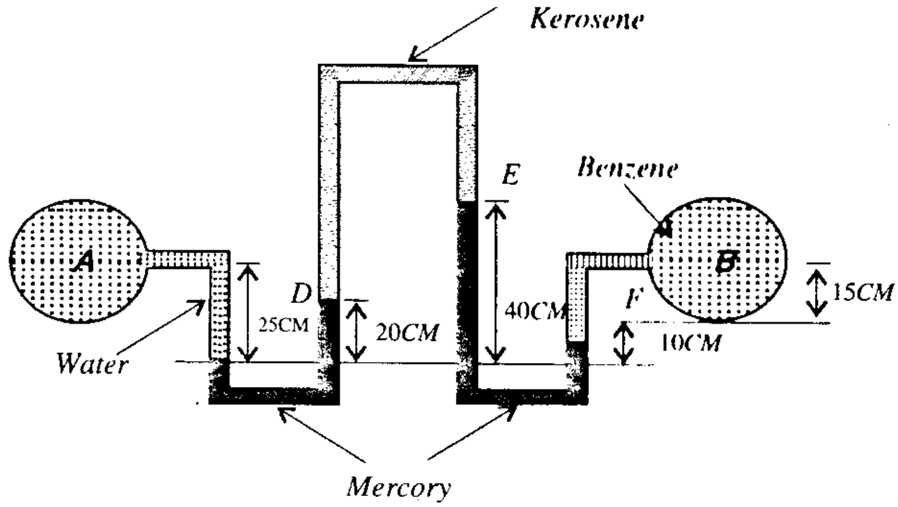
(iii) Compressibility

(iv) Vapour Pressure

(b) Calculate the atmospheric pressure at the end of troposphere, which extends upto a height of 9 km from sea level. Consider a temperature variation in the troposphere T = 288 – 0.006y. Where y is the elevation in m and T is temperature in K. the atmospheric pressure and temperature at sea level are 101.3 kN/m^2 and 288 K respectively. The characteristic gas constant for air is 287 J/kg – K. [8]

OR

Q.1 (a) A multi – tube manometer is used to determine the pressure difference between points A and B shown in the figure below. For the given values of heights, determine the pressure difference between points A and B. Specific gravities of benzene, kerosene and mercury are 0.88, 0.82 and 13.6 respectively. [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) What is the role of Reynold's transport theorem in the analysis of fluid mechanics problems? Write the expression for Reynold's transport theorem. [10]

OR

Q.2 (a) Derive Bernoulli's equation. Clearly mention the assumption made in the derivation of Bernoulli's equation. [8]

(b) Check whether the following sets of velocity components represent a possible incompressible flow. $u = 2x^2 - xy + z^2$, $v = x^2 - 4xy + y^2$, $w = 2xy - yz + y^2$ [8]

UNIT-III

Q.3 Water at 20°C flows between two large stationary parallel plates which are 2 cm apart. If the maximum velocity is 1m/s, determine (a) average velocity, (b) the velocity gradients at the plates and (c) the difference in pressure between two points 10 m apart. Viscosity of water at 20°C is 0.001 Pa–s. Consider the flow to be a fully developed one. [16]

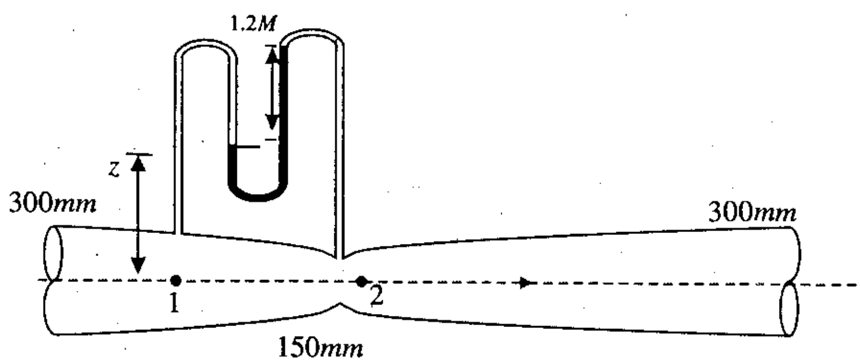
OR

Q.3 (a) Explain Prandtl Mixing Length Theory. [6]

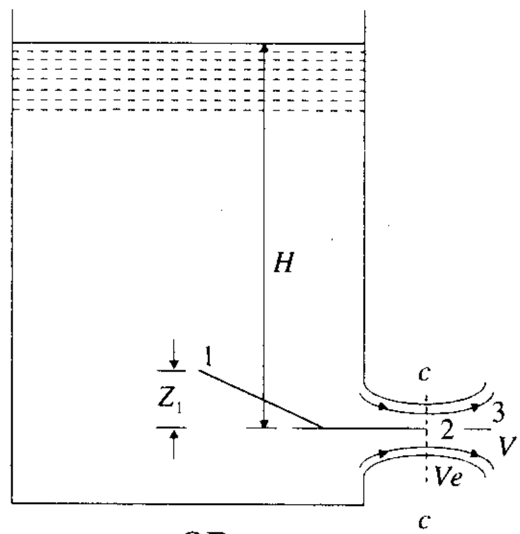
(b) Derive Hagen poiseulle's equation. Clearly mention the assumption made in the derivation of Hagen Poiseulle's equation. [10]

UNIT-IV

Q.4 (a) Water flows through a 300 mm X150 mm horizontal venturimeter at the rate of 0.065 m^3/s and the differential gauge is deflected 1.2 m, as shown in the figure below. Specific gravity of the manometric liquid is 1.6. Determine the coefficient of discharge of the venturimeter. [8]



Q.4 (b) A convergent-divergent mouthpiece is fitted to the vertical side of a tank containing water as shown in the figure below. There is no loss in the convergent part of the mouthpiece. While the head loss in the divergent part is 0.2 times the velocity head at exit. The diameter at the vena contracta is 25 mm and the head in the tank above the centre-line of the mouthpiece is 2 m. What is the maximum discharge that can by drawn through the outlet and what should be the corresponding diameter at the outlet. Assume that the pressure in the system may be permitted to fall to 2.5 m of water absolute pressure head. Atmospheric pressure head = 10.3 m of water. [8]



OR

Q.4 (a) What is hydraulic and energy gradient line? Explain their significance. [6]

(b) Water at 20 °C flows through a 500 m long cast-iron pipe of 50 mm diameter at $0.005 m^3/s$. Determine the loss of head in friction. Also calculate the pumping power required to maintain the flow. Average surface roughness for cast-iron pipe is 0.25 mm. Kinematic viscosity of water at 20 °C is $10^{-6} m^2/s$. [10]

UNIT-V

Q.5 (a) Explain the classification of hydraulic turbines. [8]

(b) Explain the working principle of hydraulic coupling with a neat sketch. [8]

OR

Q.5 (a) Explain the working principle of hydraulic intensifier with a neat sketch. [8]

(b) Write short note on following (any two) [4×2=8]

(i) Draft tube

(ii) Specific speed of turbines

(iii) Hydraulic Press

4E4142	Roll No. ___________ Total No of Pages: 3

4E4142
B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Automobile Engineering
4AE3A Machining & Machine Tools
AE, ME

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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) Classified the metal removal processes. Sketch a single point cutting tool and explain the complete geometry of it. [8]

(b) Identify the forces involved in a cutting operation. Show them on merchant circle diagram. Which force contributes to the power required? [8]

OR

Q.1 (a) Explain the various types of Chips. [4]

(b) Differentiate orthogonal cutting and oblique cutting. In an orthogonal cutting process, the following observations were made: Depth of cut = 0.25mm, width of cut = 4mm, chip thickness ratio = 0.45, cutting velocity = 40m/min. Cutting force = 1150N, thrust force = 140N, rake angle = 10°. Determine Shear plane angle, friction angle and resultant force and force component parallel to shear plane. Also calculate power consumed during the cutting operations. [12]

UNIT-II

Q.2 (a) What is machinability index? What are the parameters which affects machinability. [6]

(b) Discuss the different mechanism of tool wear in machining. [6]

(c) Mention the requirement of cutting fluids. [4]

OR

Q.2 (a) Explain Taylor's tool life equation. A generalized Taylor's tool life equation was obtained for HSS tool;

$$V = \frac{C}{T^{0.13}\, f^{0.6}\, d^{0.3}}$$

A 60 min tool life was obtained using the following parameters V = 40m/min, f = 0.25 mm/rev, d = 2mm. Compute the tool life if cutting speed feed and depth of cut are increased by 25% individually. [10]

(b) Explain the different types of tool materials and their applications [6]

UNIT-III

Q.3 (a) Explain various parts of capstan & turret lathe machines. [8]

(b) Describe the construction & working of Milling Machine. [8]

OR

Q.3 (a) What is a 'Twist drill'? Make a neat sketch of a twist drill and show its different parts on it. [6]

(b) Explain with the help of neat sketch the working principle of a shaper. [6]

(c) Compare the merits & demerits of Broaching with other machining operations.[4]

UNIT-IV

Q.4 (a) What materials are used in manufacturing of grinding wheels? What properties they impart to the wheel? [6]

(b) Mention the marking system of grinding wheel having the specification: A60 K 5 V 18. [6]

(c) Differentiate Honing Process and super finishing operation. [4]

OR

Q.4 (a) What are the different methods of thread manufacturing? Explain any two methods. [4]

(b) Write short notes of following [12]

(i) Honing

(ii) Lapping

(iii) Polishing

(iv) Buffing

UNIT-V

Q.5 (a) Elaborate the various gear finishing methods. [8]

(b) Explain 'Gear hobbing process'. Also mention advantages and limitations of it.[8]

OR

Q.5 (a) Differentiate gear generation method and gear forming method. Explain gear shaping process. [8]

(b) What are the different high velocity methods? Explain any two methods. [8]

4E4143

Roll No. ____________ Total No of Pages: 4

4E4143

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Automobile Engineering
4AE4A Design of Machine Elements-I
AE, ME, PI

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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. ____________

UNIT-I

Q.1 (a) What is standardization? What are the advantages of standardization? [3+3=6]

(b) Explain in detail the design considerations of casting with neat sketches. [10]

OR

Q.1 (a) Write short note on mechanical properties of materials. [6]

(b) Explain in detail design considerations of machine parts. [10]

UNIT-II

Q.2 (a) Write the design procedure of cotter joint. [8]

(b) It is required to design a square key for fixing a pulley on the shaft, that is 25mm diameter. The shaft is transmitting 15 kW power at 720 rpm. The key is made of steel (S_{yt} = 460 N/mm^2) and the factor of safety is 3. For key material, the yield strength in compression can be assumed to be equal to the yield strength in tension. Determine the dimension of the key. [8]

OR

Q.2 (a) What is knuckle joint? Where do you use knuckle joint? Give practical examples. [4]

(b) The stresses induced at a critical point in a machine component made of steel (Syt = 380 N (mm^2) are as follows [12]

σ x = 100N/mm^2

σ y = 40 N/mm^2

τ xy = 80 N/mm^2

Calculate the factor of safety by

(i) The maximum normal stress theory

(ii) The maximum shear stress theory

(iii) The distortion energy theory

UNIT-III

Q.3 (a) A semi – elliptic leaf spring used for automobile suspension consists of three extra full – length leaves and 15 graduated – length leaves, including the master leaf. The centre – to – centre distance between two eyes of the spring is 1m. The maximum force that can act on the spring is 75 kN. For each leaf, the ratio of width to thickness is 9:1. The modulus of elasticity of the leaf material is 207000 N/mm^2. The leaves are pre – stressed in such a way that when the force is maximum, the stresses in all leaves are same and equal to 450 N/mm^2. [12]

Determine-

(i) The width and thickness of the leaves.

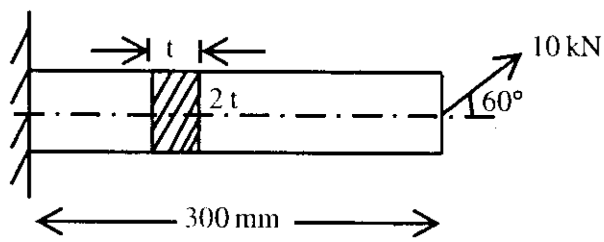
(ii) The initial nip

(iii) The initial pre – load required to close the gap 'C' between extra full – length leaves and graduated length leaves.

(b) What is the objective of shot peening of spring? [4]

OR

Q.3 (a) For a beam made of C.I. given below, determine the dimensions of the cross section.



Use followings:

$S_{ut} = 200\ N/mm^2$

F.S. = 2.5

The depth of cross section is twice of the width.

Use maximum normal stress theory. [12]

(b) What are the second type of lever and third type of lever? Give their examples. [4]

UNIT-IV

Q.4 It is required to design a rigid type of flange coupling to connect two shafts. The input shaft transmits 37.5 kW power at 180 rpm to the output shaft through the coupling.
Use following: [16]
Service factor = 1.5

Allowable shear stress for shaft = $76\ \frac{N}{mm^2}$

Allowable shear stress for keys & bolt = $80\ \frac{N}{mm^2}$

Allowable cruishing stress for keys & bolt = $240\ \frac{N}{mm^2}$

Allowable shear stress for flanges = $16.67\ \frac{N}{mm^2}$

Take Number of bolts = 4

OR

Q.4 (a) A solid shaft of diameter d is used in power transmission. Due to modification of existing system, it is required to replace the solid shaft by a hollow shaft of the same material and equally strong in torsion. Further the weight of hollow shaft per metre length should be half of the solid shaft.. Determine the outer diameter of hallow shaft in terms of 'd'. [10]

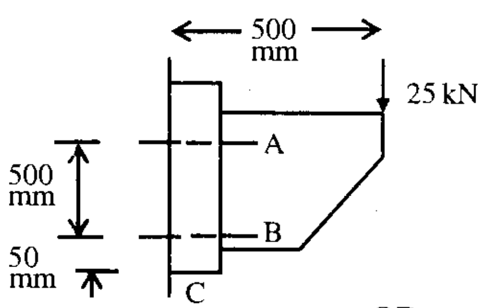
(b) Explain equivalent twisting moment for shaft. [4]

(c) What do you understand by torsional rigidity? [2]

UNIT-V

Q.5 (a) What do you mean by 'Bolt of uniform strength'? [4]

(b) A wall bracket is attached to a wall by means of four identical bolts, two at A and two at B. Assuming that the bracket is held against the wall and prevented from tipping about C by all four bolts and using an allowable tensile stress in the bolts as 35 N/mm^2. Determine the size of the bolts on the basis of maximum principal stress theory. [12]



OR

Q.5 (a) Give in detail, the design procedure of screw Jack. [10]

(b) Explain self – locking of power screw. [3]

(c) What do you mean by overhauling of power screw? [3]

4E4144

Roll No. ________ Total No of Pages: 4

4E4144

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Automobile Engineering
4AE5A Industrial Engineering
AE, ME

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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.

1.________________ 2.________________

UNIT-I

Q.1 What are the principles of motion economy related to work place? If these principles are adopted in design of work place, what will be the advantages? [16]

OR

Q.1 (a) Discuss the functions of industrial engineering and the role it can play in raising industrial productivity. [8]

(b) Discuss the difference between time study and method study, with suitable example. [8]

UNIT-II

Q.2 (a) Discuss the contribution of following in the development of industrial management: [8]

(i) Henri Fayol

(ii) F. W. Taylor

(b) Define 'Standard Time' of an operation. Briefly describe the method used to obtain time standards. [8]

OR

Q.2 (a) Write the basic procedure for carrying out work measurement. [8]

(b) The observation is recorded to be 15 minutes for a job done by a worker whose is 80. Following allowances are recommended by the management. [8]

(i) Personal need allowance : 5% of Basic time (B. T.)

(ii) Basic fatigue allowance : 2% of B. T.

(iii) Contingency work allowance : 1% of B. T.

(iv) Contingency delay allowance : 2% of B. T.

(a) Determine B. T. standard time and work content for job.

(b) If 1500 articles are to be produced in an eight hour day at an estimated level of performance of 90% determine the number of workers required to do the work.

UNIT-III

Q.3 (a) What are the objectives of financial management? Write in detail about the sources of finances? [8]

(b) Differentiate between Joint Stock Company and Co-operative society, with suitable example. [8]

OR

Q.3 (a) Discuss the following: [8]

(i) Functional organization

(ii) Line staff committee organization

(b) Write short note on following: [8]

(i) Borrowed capital

(ii) Surplus profit

UNIT-IV

Q.4 (a) Discuss the following: [8]

(i) Profit investment ratio

(ii) Inventory ratio

(b) Explain the discounting and compounding technique of time value of money? [8]

OR

Q.4 (a) Write short note with example on "Profit and loss statements" and "Balance sheet"? [12]

4E4145

Roll No. ___________ Total No of Pages: 3

4E4145
B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Automobile Engineering
4AE6A I. C. Engines
AE, ME

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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.

1.____________________ 2.____________________

UNIT-I

Q.1 A Four Stroke petrol engine having following specifications No. of cylinder = 4, Bore = 110mm, stroke = 130mm, engine speed = 2250 r.p.m., brake power = 36kw, fuel consumption = 10.5kg/h, Air box orifice diameter = 75mm, C_α=0.6, Cv of fuel = 42,000 kj/kg. [16]

During the performance test following data were observed: pressure drop across the orifice = 4.1cm of water, Atmospheric temperature = 15°C and pressure = 1.0135 bar.

Calculate:

(a) Brake thermal efficiency

(b) Brake mean effectual pressure

(c) Volumetric efficiency.

OR

Q.1 (a) Explain energy balance of I.C. engine. [8]

(b) What are the main constituents of emission from S.I. engine? Write down the limits of emissions as per Indian standard. [4+4=8]

UNIT-II

Q.2 Explain the combustion in S.I. engine. Draw P-Q diagram and explain three stage of combustion. [4+4+8=16]

OR

Q.2 Explain the four stage of combustion in C.I engine and draw P-Q diagram for combustion. [12+4=16]

UNIT-III

Q.3 (a) What are fuel requirement for following operating condition of S.I. engine: [4×3=12]

(i) Idling and low load.

(ii) Cruising range.

(iii) Maximum power range

(b) Explain working of mechanical fuel pump. [4]

OR

Q.3 (a) Explain working of electronic ignition system. [8]

(b) Explain the following:

(i) Common rail injection system

(ii) Distributor injection system. [4×2=8]

UNIT-IV

Q.4 (a) Why cooling system is required in I.C. engines? What are the effects of over cooling and under cooling? [4+4=8]

(b) Explain different methods of supercharging in I.C. engines. [4×2=8]

OR

Q.4 (a) What are the various functions of lubrication in I.C. engines? Explain. How lubricating oils are rated? [5+3=8]

(b) Explain pressurise wet sump lubrication system. [8]

UNIT-V

Q.5 (a) Explain the construction and working of dual fuel engine cycle. Explain its merits and demerits as compare to conventional cycle. [8+4=12]

(b) What are the applications of multifuel engines? [4]

OR

Q.5 (a) Explain the followings:

(i) Free Piston Engine

(ii) Rotary Engine. [8×2]

OR

Q.4 (a) Find the head lost due to friction in a pipe of diameter 300 [illegible] through which water is flowing at a velocity of 3m/s using.

(i) Darcy formula

(ii) Chezy's formula for which c = 60 [illegible]

(b) At a sudden enlargement of water main from 240mm to [illegible] hydraulic gradient raises by 10mm. Estimate the rate of flow [illegible]

UNIT-V

Q.5 (a) Derive the formula for the drag force on a flat plate due to boundary layer [illegible]

(b) Describe in detail –

(i) Laminar boundary layer

(ii) Turbulent boundary layer [illegible]

OR

Q.5 (a) Derive the expression for drag and lift. [illegible]

(b) Write short notes on (Any Two)

(i) Drag on sphere and cylinder

(ii) Development of lift on circular cylinder

(ii) Development of lift on an airfoil [illegible]

4E4141

4E4141
B.Tech. IV-Sem (Back) Examination June-July 2016
Automobile Engineering
4AE2A(O) Fluid Mechanics

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any five questians, 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. NIL ____________ 2. NIL ____________

UNIT-I

Q.1 (a) Calculate the density, specific weight and weight of one litre of petrol of specific gravity = 0.7 [4]

(b) Explain surface tension and capillarity in detail. [6]

(c) What is manometers? Classify and explain simple manometers and differential manometers. [6]

OR

Q.4 (a) Find the head lost due to friction in a pipe of diameter 300 mm and length 50 m through which water is flowing at a velocity of 3m/s using.

(i) Darcy formula

(ii) Chezy's formula for which c = 60 [8]

(b) At a sudden enlargement of water main from 240mm to 480mm diameter the hydraulic gradient raises by 10mm. Estimate the rate of flow [8]

UNIT-V

Q.5 (a) Derive the formula for the drag force on a flat plate due to boundary layer [8]

(b) Describe in detail –

(i) Laminar boundary layer

(ii) Turbulent boundary layer [illegible]

OR

Q.5 (a) Derive the expression for drag and lift. [8]

(b) Write short notes on (Any Two)

(i) Drag on sphere and cylinder

(ii) Development of lift on circular cylinder

(ii) Development of lift on an airfoil [illegible]

4E4141

Roll No. ________ Total No of Pages: 4

4E4141

B.Tech. IV-Sem (Back) Examination June-July 2016

Automobile Engineering

4AE2A(O) Fluid Mechanics

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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. NIL 2. NIL

UNIT-I

Q.1 (a) Calculate the density, specific weight and weight of one litre of petrol of specific gravity = 0.7 [4]

(b) Explain surface tension and capillarity in detail. [6]

(c) What is manometers? Classify and explain simple manometers and differential manometers. [6]

4E2050

Roll No. ___________ Total No of Pages: 3

4E2050
B.Tech. IV-Sem (Back) Exam; June-July 2016
Mechanical Engineering
4ME2(O) Automobile Engineering

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 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) Describe briefly basic layout of chassis with neat and clear diagram. [6]

(b) Write various functions of frame. [4]

(c) Define clutch. Write functions and requirements of clutch. [6]

OR

(a) Explain various types of chassis Frames. [6]

(b) Describe working of cone clutch with neat and clean sketch. [6]

(c) Compare fluid coupling and hydraulic torque converter. [4]

UNIT-II

Q.2 (a) Explain constructing and working of overdrive with neat and clear sketch. Also write advantages of overdrive. [8]

(b) Write short notes on: [4×2=8]

(i) Propeller shaft

(ii) Rear Axle

OR

Q.2 (a) Define universal joint. Explain constructing and working of universal joint with neat and clean sketch. [8]

(b) What is differential? Explain constructing and operating of differential with neat and clean sketch. [8]

UNIT-III

Q.3 (a) Write short notes on: [4×4=16]

(i) Tyre inflation pressure

(ii) Caster

(iii) Under and over steering

(iv) Toe – in and Toe – out

OR

Q.3 (a) Describe Ackermann steering gear and Davis steering gear with neat and clean sketch. [8]

(b) Explain hydraulic brakes in detail. Also write advantages and disadvantages of hydraulic brakes. [8]

UNIT-IV

Q.4 (a) Explain briefly working of various components of lead Acid battery. [4]

(b) Explain various methods of battery charging. [8]

(c) Explain over charging and under charging. [4]

OR

Q.4 (a) Write requirements of ignition system in vehicle. [4]

(b) Explain working and constructing of coil ignition system with neat and clean diagram. [8]

(c) Explain briefly working of electric horn. [4]

UNIT-V

Q.5 (a) Explain working of various components of air conditioning system. [10]

(b) What is Air bags? Explain briefly working of air bags. [6]

OR

Q.5 Write notes on: - [8×2=16]

(i) Night vision system (NVS)

(ii) Global positioning system (GPS)

4E2054	Roll No. ____________ Total No of Pages: 4

4E2054
B.Tech. IV-Sem (Back) Exam; June-July 2016
Automobile Engineering
4AE6(O) Mechanical Measurement and Control
Common with AE, ME

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 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) Explain the types of measurement with examples. [8]

(b) Explain the working of hydraulic load cell and optical pyrometer with neat sketch. [8]

OR

Q.1 (a) State different performance characteristic of an instrumentation system. [8]

(b) List the applications of strain gauges on rotating shafts with their suitable sketch. [8]

UNIT-II

Q.2 (a) Describe the working principal & construction of optical pyrometer. [8]

(b) Explain the mechanical & electrical methods for measuring the liquid level. [8]

OR

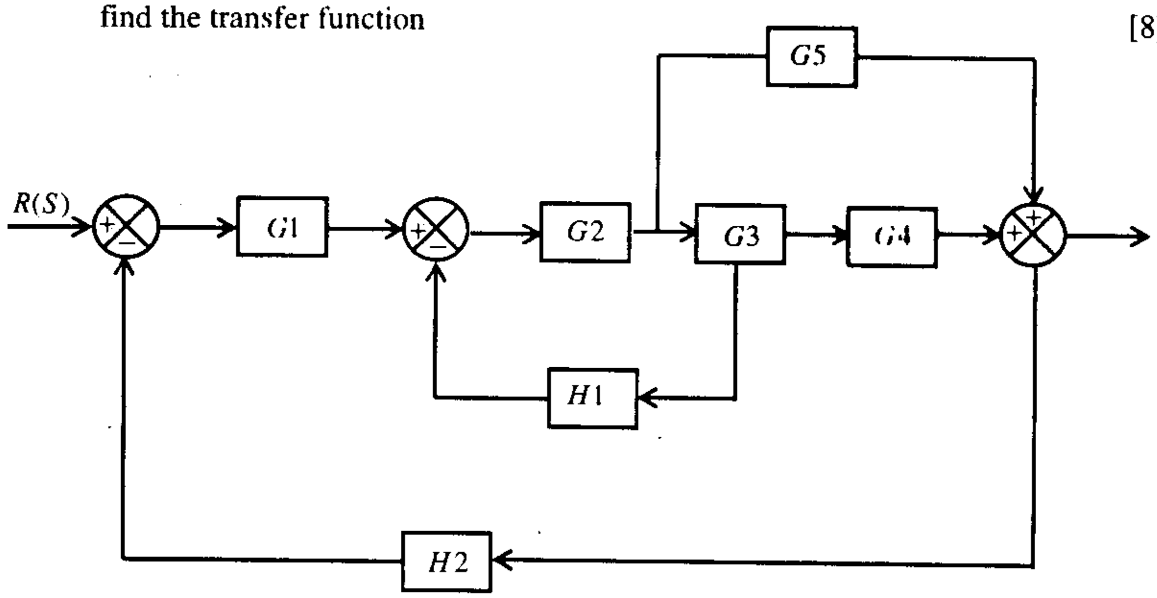
Q.2 (a) Explain the various temperature measuring transducers with neat sketches. [8]

(b) Classify flow measurement methods. Briefly explain any two secondary flow meters. [8]

UNIT-III

Q.3 (a) What is open and closed loop control system? Explain with suitable example. [8]

(b) Using block diagram reduction technique reduce the system shown below and find the transfer function [8]



OR

Q.3 Define any two: [8+8=16]

(a) Components of an Analog Data Acquisition System.

(b) Components of Digital Data Acquisition System.

(c) Multichannel Data Acquisition System.

UNIT-IV

Q.4 For a negative feedback control System having forward path transfer function.

$$G(s) = \frac{K}{s(s+6)} \text{ and } H(s)=1$$

(i) Determine the value of gain K for the system to have damping ratio of 0.832.

(ii) For this value of gain K, determine the complete time response to an input $r(t) = 2u(t)$, where $u(t)$ is a unit step function. [8+8=16]

OR

Q.4 (a) Explain the method of determining the mathematical modeling by nodal analysis. [8]

(b) Explain the AC and DC servomotor. [8]

UNIT-V

Q.5 With the help of Routh – Hurwitz criterion comment upon the stability of the system having the following characteristic equation

$$S^6 + S^5 + 8s^4 + 6s^3 + 20s^2 + 8s + 10 = 0$$ [16]

OR

Q.5 (a) Sketch the root locus of unit feedback system with an open loop transfer function as K varied form o to ∞.

$$G\,(s)\,4\,(s) = \frac{K}{s\,(s+2)\,(s+3)}$$ [8]

(b) Explain the steps involved in drawing the root locus techniques & find out the stability of the system. [8]
