AUTO/ME AUTO

4th Semester Diploma Engineering Examination, 2019

Subject : Automobile Transmission System

Subject Code : AUT–404

Full Marks : 80

Time : 3 Hours

Pass Marks : 26

Answer in your own words.

Answer five *questions in which* Question No. 1 *is compulsory and* answer *any four* from the rest questions.

All questions carry equal marks.

1.   Choose the correct answer: 2×8=16

   (i) Transfer case is located next to the gearbox is
       (a) front wheel drive   (b) rear wheel drive
       (c) four wheel drive   (d) All of these

   (ii) In four wheel drive there is
       (a) no live axle   (b) one live axle
       (c) two live axle   (d) one dead axle

   (iii) The following provides a smooth means of disengagement and engagement between the engine and the remainder of transmissions system:
       (a) Clutch   (b) Gearbox
       (c) Propeller shaft   (d) Differential

   (iv) When brakes are applied on a moving vehicle, the kinetic energy is converted to
       (a) mechanical energy   (b) heat energy
       (c) electrical energy   (d) potential energy

   (v) The following is not a drum brake:
       (a) External contracting brake   (b) Internal expanding brake
       (c) Disc brake   (d) All of these

   (vi) Coil springs absorb shocks by
       (a) bending   (b) twisting
       (c) compression   (d) tension

   (vii) The only service that a steering linkage normally requires is
       (a) tie-rod adjustment   (b) lubrications
       (c) ball-joint replacement   (d) None of these

   (viii) Hard steering is a result of
       (a) very loose steering linkage.   (b) worn out steering linkage.
       (c) too loose front wheel bearings.   (d) incorrect lubricant.

12686

Please Turn Over

2. (a) With neat sketch explain working of centrifugal clutch.

   (b) State different types of clutch and suggest material for clutch living.

3. What are the types of gearboxes? Explain with neat sketch construction and working of synchromesh gearbox.

4. Draw and explain construction of tubeless tyres. Explain any four tyre nomenclature.

5. What is differential lock? Explain with sketch.

6. Explain construction, working and applications of steering gearbox.

7. Write short notes on (any four):

   (a) Gear shift mechanism
   (b) Fluid coupling
   (c) Torque convertor
   (d) Rear Axle Casing
   (e) Parking Brake systems
   (f) Steering adjustment

4th Semester Diploma Engineering Examination, 2019

Subject : Automobile Manufacturing Process   Full Marks : 80

Subject Code : AUT-402

Time : 3 Hours   Pass Marks : 26

Answer in your own words.

Answer five questions in which Question No. 1 *is compulsory and answer any four from rest questions.*

All questions carry equal marks.

1. Choose the correct answer: 2×8=16

   (i) Which of the following is a type of forging?

      (a) Open die   (b) Closed die

      (c) Impression die   (d) All of these

   (ii) The commonly used flux in brazing is

      (a) Borax   (b) Rosin

      (c) Lead sulphide   (d) Zinc chloride

   (iii) Which of the following is not a surface finishing process?

      (a) Honing   (b) Buffing

      (c) Lapping   (d) Turning

   (iv) The process of joining similar or dissimilar materials by heating them below 450°C using non-ferrous material is called

      (a) Brazing   (b) Soldering

      (c) Welding   (d) All of these

   (v) Micro ECM is used to machine which type of parts?

      (a) Large parts   (b) Micro parts

      (c) Normal sized parts   (d) All of these

   (vi) CNC is not applicable in

      (a) Drilling machine   (b) Milling machine

      (c) Lathe   (d) None of these

   (vii) Which of the following is a type of die?

      (a) Simple die   (b) Progressive die

      (c) Compound die   (d) All of these

12684   **Please Turn Over**

(viii) Slotting can be performed more effectively by milling machine

  (a) horizontal   (b) vertical

  (c) Both (a) & (b)   (d) None of these

2. (a) Describe press forging. How does it differ from drop forging?

  (b) Explain in brief the defects in forging.   8+8=16

3. (a) Describe the mechanism of shearing in sheet metal operation.

  (b) Explain five operations in sheet metal operation.   8+8=16

4. (a) Explain tungsten inert gas (TIG) and metal inert gas (MIG) welding processes.

  (b) Explain two processes of surface coating and surface finishing.   8+8=16

5. Explain the working principle of CNC machine. What are the advantages and disadvantages of CNC machine?   16

6. (a) Name the various operations performed in lathe.

  (b) Write down the types of milling machine and its principal parts.   8+8=16

7. Write short notes on *any four*:   4×4=16

  (a) Canned cycle

  (b) Robotics

  (c) Grinding machine

  (d) Press components used in automobiles

  (e) USM for manufacturing of automobile component

  (f) Acid and electrolytic cleaning

MECH/AUTO/ME AUTO

4th Semester Diploma Engineering Examination, 2019

Subject : Thermal Engineering

Full Marks : 80

Subject Code : MEC-404

Time : 3 Hours

Pass Marks : 26

Answer in your own words.

Answer five *questions in which* Question No. 1 *is compulsory and answer* any four *from rest questions.*

All *questions carry equal marks.*

1. Choose the correct answer: 2×8=16

   (i) Absolute zero temperature is taken as

      (a) − 273°C   (b) 273°C

      (c) 237°C   (d) − 373°C

  (ii) A system and its environment put together constitute _____.

      (a) an adiabatic system   (b) an isolated system

      (c) a segregated system   (d) a homogeneous systems

  (iii) Which parameter remains constant during a reversible isothermal process?

      (a) Rate of heat exchange   (b) Internal energy

      (c) Enthalpy   (d) Entropy

  (iv) First law of the thermodynamic refers to conservation of _____.

      (a) mass   (b) momentum

      (c) energy   (d) force

  (v) The internal energy of an ideal gas is function of _____.

      (a) pressure only   (b) absolute temperature only

      (c) pressure and volume   (d) pressure, volume and temperature

  (vi) Under what condition the change in the enthalpy of a system equals the heat supplied?

      (a) Constant volume   (b) Constant pressure

      (c) Constant temperature   (d) Standard temperature, pressure conditions

  (vii) The equation of state of an ideal gas is a relationship between the variables

      (a) pressure and volume   (b) pressure and temperature

      (c) pressure, volume and temperature   (d) None of these

Please Turn Over

Scanned by CamScanner

(viii) The ordinate of a mollier diagram represents _____.

    (a) temperature   (b) pressure

    (c) entropy   (d) specific enthalpy

2. (a) Define

    (i) Isochoric process

    (ii) Isobaric process

    (iii) Isothermal process

    (iv) Black and grey bodies

    (b) The initial pressure and temperature of the air in a truck tyre are 250 kPa and 35°C respectively. After certain journey the pressure has increased to 280 kPa. Determine the temperature of the air inside the tyre after the journey

    Take $R = 287$ Jkg/k and $C_v = 718$ J/kg-k for air.   (4×2)+8=16

3. (a) What are the function of a condenser in a Steam plant? What are different types of Steam condensers?   6

    (b) During an expansion of a gas, it is observed that 10,000 N-m of work is done on the piston and 7 kJ of heat is absorbed. Calculate the work required to compress the gas to its initial condition if 2·0 kJ at heat is rejected to the surrounding.   8+8=16

4. (a) Describe constructions and working of a Cochran boiler with a neat sketch.   6

    (b) One kg of an ideal gas is heated from 18·3°C to 93·4°C assuming $R = 0.287$ kJ/kgK and $Y = 1.38$ for the gas find out

    (i) specific heat

    (ii) change in internal energy

    (iii) change in enthalpy   8+8=16

5. (a) Compare the Flate plate collector and Concentrating collector.   6

    (b) The inner surface of a 352 mm brick wall of a furnace is kept at 800°C and it is found that the outer surface temperature is 170°C. Calculate the heat loss per square meter of wall area. Given that the conductivity is 0·865 W/mc.   8+8=16

6. (a) What do you know about Steam tables? Define the term specific volume of Dry-steam and the specific volume of Wet-steam.

    (b) Determine the dryness fraction of a sample of steam weighing 4·7 kg if the total heat of the sample is 11000 kJ. Steam pressure is 5·0 bar (abs.).   8+8=16

7. (a) Define the 'Thermodynamic system'. What are its important types?

    (b) The volume of a high altitude chamber is $40m^3$. It is put into operation by reducing pressure from 1 bar to 0·4 bar and temperature from 25°C to 5°C. How many kg of air must be removed from the chamber during the process? Express this mass a volume measured at 1 bar and 25°C.   8+8=16

4th Semester Diploma Engineering Examination, 2019

Subject : Theory of Machine   **Full Marks : 80**

Subject Code : MEC-405

Time : 3 Hours   **Pass Marks : 26**

Answer in your own words.

Answer five *questions in which Question No. 1 is compulsory and answer* any four *from the rest questions.*

All questions carry equal Marks.

---

1. Choose the correct answer from the following: 2×8=16

    (i) A universal joint is an example of _____ pair.
        (a) Sliding   (b) Lower
        (c) Higher   (d) None of these

    (ii) The magnitude of linear velocity of a point B on a link AB relative to point A is equal to
        (a) $\omega^2 . AB$ (b) $\omega . (AB)^2$
        (c) $\omega . AB$ (d) None of these

    (iii) A Hartnell governor is a _____ governor.
        (a) Pendulum type   (b) Inertia type
        (c) Spring loaded   (d) Dead weight

    (iv) The size of a cam depends on _____ circle.
        (a) Prime   (b) Outer
        (c) Base   (d) Pitch

    (v) The velocity ratio of the belt drive due to slip of the belt _____.
        (a) increases   (b) decreases
        (c) remains unchanged   (d) unpredictable

    (vi) _____ dynamometer is an absorption type dynamometer.
        (a) Rope brake   (b) Prony brake
        (c) Torsion   (d) Both (a) and (b)

    (vii) A body is said to have _____ vibration, when there is reduction in amplitude over every cycle of vibration.
        (a) Damped   (b) Free
        (c) Forced   (d) None of these

    (vii) Klein's construction is used to determine _____ various parts.
        (a) Displacement   (b) Velocity
        (c) Acceleration   (d) Angular acceleration

Please Turn Over

2. (a) Explain the terms:
   (i) Lower pair
   (ii) Higher pair
   (iii) Kinematic chain
   (iv) Inversion

   (b) Explain Crank and slotted lever quick return motion mechanism with a neat sketch. 8

3. (a) Discuss four different types of cams and followers with suitable sketches.

   (b) A cam is to give the following motion to a knife edged follower:
      (i) Outer stroke during 60° of cam rotation
      (ii) Dwell for the next 30° of cam rotation
      (iii) Return stroke during next 60° of cam rotation and
      (iv) Dwell for the remaining 210° of cam rotation

   The stroke of the follower is 40 mm. and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both outer and return strokes. Draw the profile of the cam when the axis of follower passes through the axis of the cam shaft. 8

4. (a) Obtain an expression for the length of a belt in an open belt drive. 8

   (b) Discuss types of gear trains with suitable sketches. 8

5. (a) What is the function of a fly wheel? How does it differ from that of a governor? 8

   (b) In a pinned arm Watt governor, length of each arm is 300 mm. Determine the height of sleeve and radius of rotation of the balls when the governor speed is 60 r.p.m and 80 r.p.m 8

6. (a) Explain the principles of operation of an internal expanding shoe brake with suitable sketches. 8

   (b) What do you mean by balancing? Explain the harmful effects of vibration and their remedies. 8

7. (a) Describe the working of a single plate clutch with a neat sketch. 8

   (b) A shaft has a number of collars integrated with it. The external diameter of collar is 400 mm. and the staff diameter is 250 mm. If the intensity of uniform pressure is $0 \cdot 35 \ N/mm^2$ and the coefficient of friction is $0 \cdot 05$, Calculate the power absorbed when the staff runs at 150 r.p.m carrying a load of 150 KN and the number of collars required. 8

8. Write short notes on *any four* of the following 4×4=16
   (a) Application of Gyroscope
   (b) Eddy current dynamometer
   (c) Geneva mechanism
   (d) Limitations of steel ropes
   (e) Coefficient of fluctuation of speed
   (f) Simple pivot

IV SEMESTER DIPLOMA EXAMINATION 2019

Subject – Auto. Engg. Drawing
Subject Code -AUT403
Time – 3 Hrs.

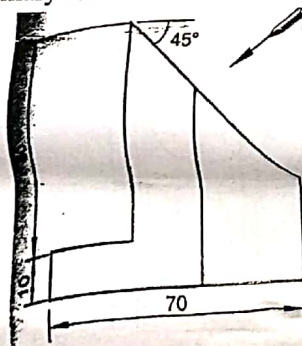F. M. -   80
P. M. -   26

Answer in your won words.
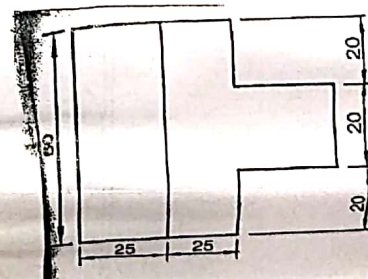*Answer any FOUR questions.*
All questions carry equal marks.

1. Attempt any **FOUR** of the following: (4×5=20)
   (a) The shaft has size $\varnothing 40^{0.05}$ and hole is $\varnothing 40^{0.00}$. Determine the type of fit between them.
   (b) Explain the terms with neat sketch:
       (i) Clearance Fit   (ii) Interference Fit
   (c) Explain the meaning of $\varnothing 1546/d8$.
   (d) Draw the symbols of the following: (i) Straightness   (ii) Flatness
   (e) Draw the sectional representation of : (i) Fillet Weld   (ii) Single-V butt

2. (a) Draw the sectional front view and top view of a single riveted double cover butt joint. Take
       the dia of the rivet = 24mm.   (2×10=20)
   (b) Fig below shows the pictorial view of an object. Draw the following view in first angle
       projection (i) Top view   (ii) Front view   (iii) Both side view
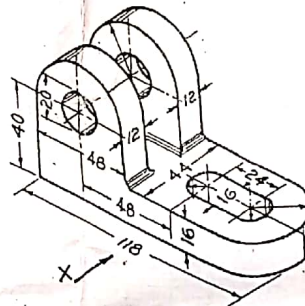
3. Draw conventional representation of the following: (20)
   (a) Glass   (b) Wood   (c) Concrete
   (d) Straight knurling   (e) Diamond knurling

4. (a) Fig (1) Shows the front view and top view of an object. Draw the given views and add the
       auxiliary view in the direction of arrow.   (10)

F - V

T - V

(Fig-1)

(b) Fig (2) Shows the isometric view of the block. Draw (i) Front view (ii) Top view.   (10)

(Fig-2)

5.   Fig (3) Shows the details of "FOOT STEP BEARING". Draw sectional F.V. And T.V. of the assembly.
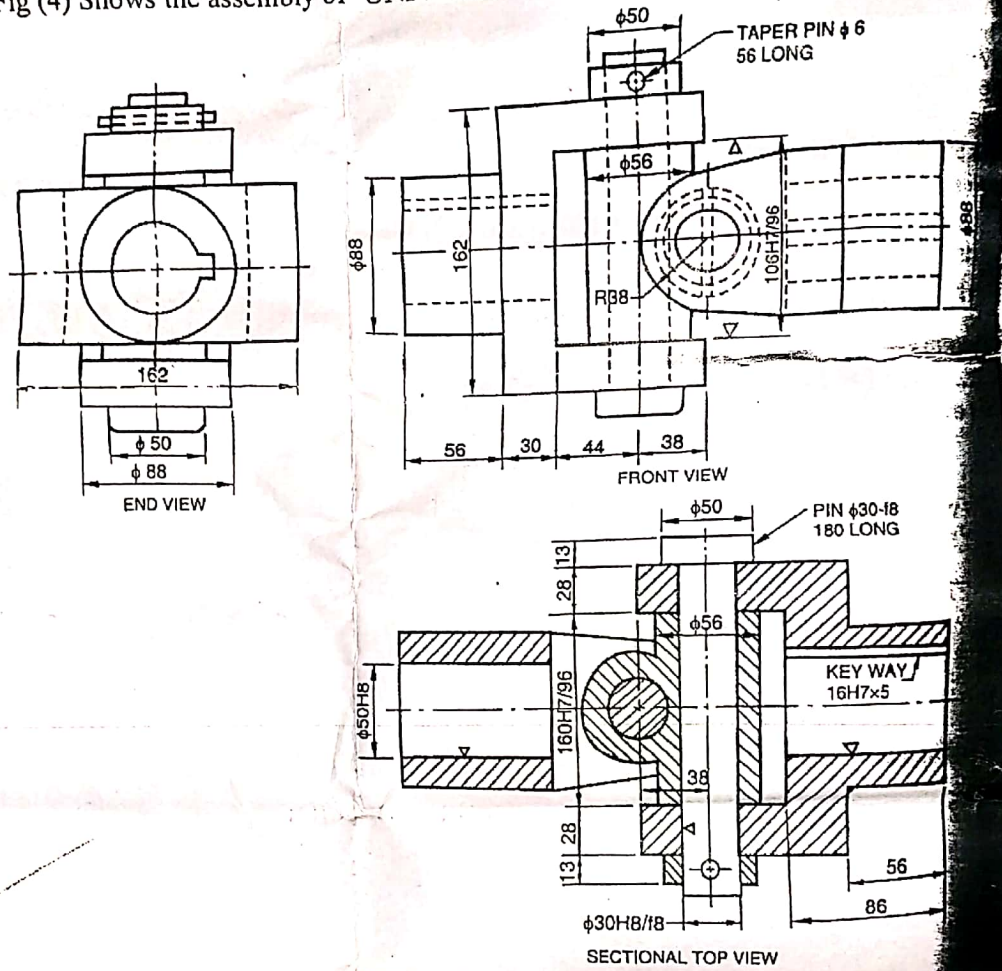
(20)

Assembly of foot step bearing

(Fig-3)

Cont..

6.   Fig (4) Shows the assembly of 'UNIVERSAL COUPLING'. Draw the details.   (20)

φ50

TAPER PIN φ6
56 LONG

φ88

162

φ56

106H7/96

φ88

R88

56   30   44   38

FRONT VIEW

φ88

162

φ 50

φ 88

END VIEW

φ50

PIN φ30-f8
180 LONG

28 13

φ56

φ50H8

160H7/96

KEY WAY
16H7×5

38

131 28

56

86

φ30H8/f8

SECTIONAL TOP VIEW

(Fig-4)
***