Question No 01

Part A

a. Explain levels of documents in an Organization.
b. What is mean by Communication Gap?
c. Outline four main factors causing this gap.
d. Explain with examples that related to Automobile,
   i. General Procedures.
   ii. Technical Procedures.
e. Planning is required to complete the job within a specified time period. What information and action that you need to collect and perform to plan a job in your work shop.

Part B

a. What is meant by "PETSEL" analysis?
b. Explain with example relevant to automobile Industry.
c. Name four different types of internal customers in your workplace.
d. Outline four benefits of effective internal customer communication.
e. How would you assess competency of a person, give five methods.
f. What do you recommend to manage time in your work place.

Question No 02

Part A

a. Adopt "Good housekeeping Practice" is important to maintain a good Occupational Health
   and Safety in a workshop. Discuss briefly about this statement.
b. What are the factors that cause for a fire?
c. List two data that to be written on safety data sheet (SDS)..
d. List four common automotive chemicals or product that may be considered hazardous materials.
e. Draw a sketch of a silt trap and petrol separator of automobile workshop drainage system.

Part B

a. In case of fire, as an employee, what are the actions should be taken in order to minimize the damages?
b. State the type of Extinguishers used in the industry and their applications.
c. What are the problems will arise, while repairing and replacing parts by guess work rather than systematically working?
d. Draw the systematically working Diagnosis procedure chart..
e. State four general inspections to identify the basic condition of a vehicle, prior to diagnosis.

Question No 03

Part A

A double acting hydraulic cylinder is to be used to transfer parts from a magazine. The cylinder is to advance fully when a push button is operated and then retract automatically. Full extension is confirmed by a roller lever valve. The cylinder is to continue forward even if the push button is released before fully extension is reached. The speed of the cylinder is to be adjustable in both directions of motion.

a. List down the components that you need to develop above system.
b. Draw system diagram using correct symbols.
c. Where is pneumatics systems preferred? List down five fields of application of pneumatics.
d. What is the operation of an air service unit and draw the graphical symbol of it?

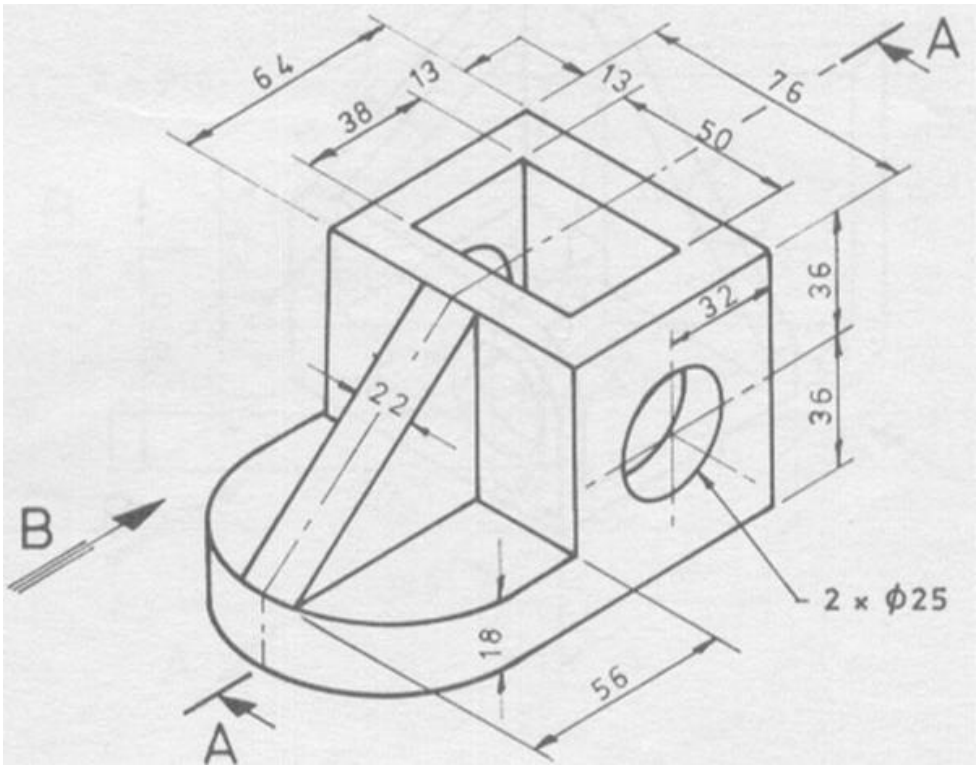
Part B

a. State advantages and disadvantages of Hydraulic system.
b. Define flow rate and flow velocity.
c. A gear pump has a 75mm outside diameter, 50mm inside diameter & 25mm width. Pump manufacturer specified that the volumetric efficiency is 90% at rated pressure. What is the corresponding actual flow rate? Pump speed is 1000rpm & what would be the required volume of the reservoir for this system?
d. Define the terms of logic controllers, used at the pneumatic systems.
e. Draw the graphical symbols and truth tables above logic controllers.

Question No 04

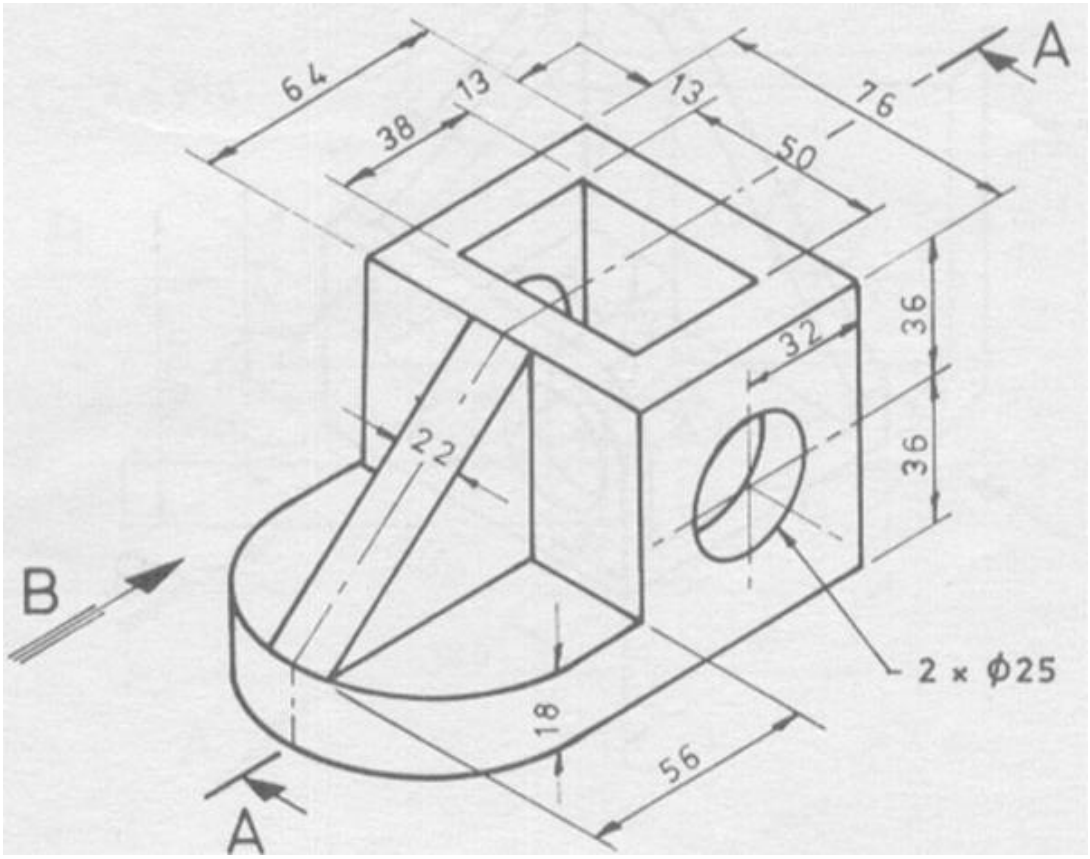
Part A

a. Draw sectional front view of A-A cross section
b. Do the dimension as per standard figure.



Part B

a. Draw Front view, side view and plan.
b. Do the dimension as per standard figure.



Question No 05

Part A

a. What are the properties that should be considered in selection of a component of Automobile units?
b. Explain the difference between Ductility and Brittleness of metal.
c. A flywheel with the diameter of 360mm increases its speed uniformly from 660rev/min to 1000rev/min in 14 seconds. Calculate:
   i. The angular acceleration of the wheel in road/sec2
   ii. The number of revolutions made during the speed change.
   iii. The linear acceleration of a point on the rim of the wheel in m/s2
d. What are the three main developments and improvements done by automotive design engineers to minimize the fuel consumption of automotive engines?
e. Indicate main defects of a vehicle, if the accident repair is not in proper standard.

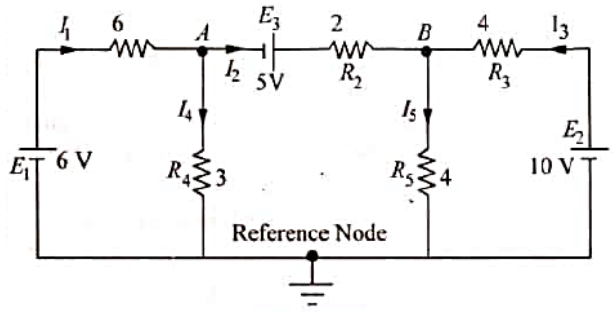
Part B

a. State various types of materials used in the Automobile Industry and their applications.
b. What are the advantages and disadvantages in casting process?
c. A motor vehicle under test starting from rest on a level road attains a speed of 80km/h 45 seconds with uniform acceleration. The brake was applied at the speed of 90km/h and uniform retardation of 3.0m/s2 was obtained. Calculate:
   i. The acceleration and Distance traveled.
   ii. The time to bring the vehicle to rest.
   iii. The total time for the rest.
   iv. The total distance traveled during the test.
d. Explain the two main factors to consider in the diagnosing of collision damage.
e. Give main influences from environment and weather which provides protection by automotive paint to a vehicle body.

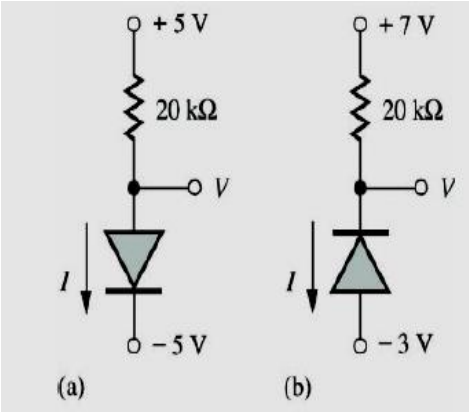
Question No 06

Part A

a. Explain briefly the function of the Magnet & Electromagnet starting motors?
b. Explain the purpose and function of the Regulator of charging system in Automobiles.
c. Find the branch currents in the circuit of figure 2 by using Nodal analyze.



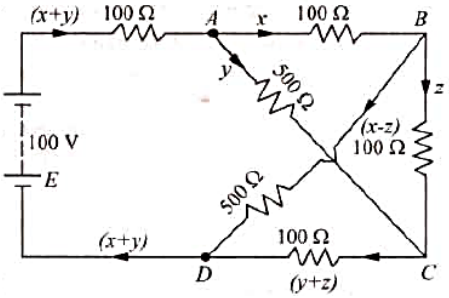
d. Find I and V in the four circuits in below Figure using the ideal diode model.
e. Repeat using the constant voltage drop model with Von = 0.7 V.



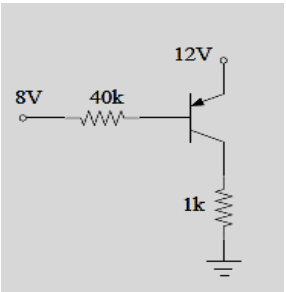
Part B

a. When comparing of electronic ignition system with conventional ignition system, what are the advantages of the electronic system
b. If the starting system in trouble what are the major point to be tested to rectify the fault? What are the testing instruments to be needed?

c. Using Kirchhoff's law, determine the current supplied by the battery in the circuit shown in below figure.



d. Compute transistor parameters (IB,IC,IE and V_{CE}) for below circuit (Si BJT with β= 100).



e. Briefly explain **p-type** and **n-type** semiconductors.

Question No 07

Part A

a. Four stroke four cylinder engine has a bore 90mm,stroke 80mm and compression ratio 11:1.This engine is rebored to 2mm oversize. Calculate;
   i. Original engine capacity.
   ii. New Engine Capacity.
   iii. Compression ratio after reboring.
b. Draw performance and performance curves variation with engine speed.
c. Briefly explain their variation.
d. Write 10 (ten) factors that cause bad exhaust emissions.
e. Write one method of controlling the pollutants in an exhaust system.

Part B

a. State Square Engine and their advantages.
b. Explain Morse Test.
c. What are the advantages using a higher compression ratio in an engine.
d. What are the barriers in increasing compression ratio on a petrol engine?
e. Gas analyzer for Automobile what are the most pollutant gasses in exhaust gas.
f. Explain the use of Lambda Sensors and its function including the characteristic graph.

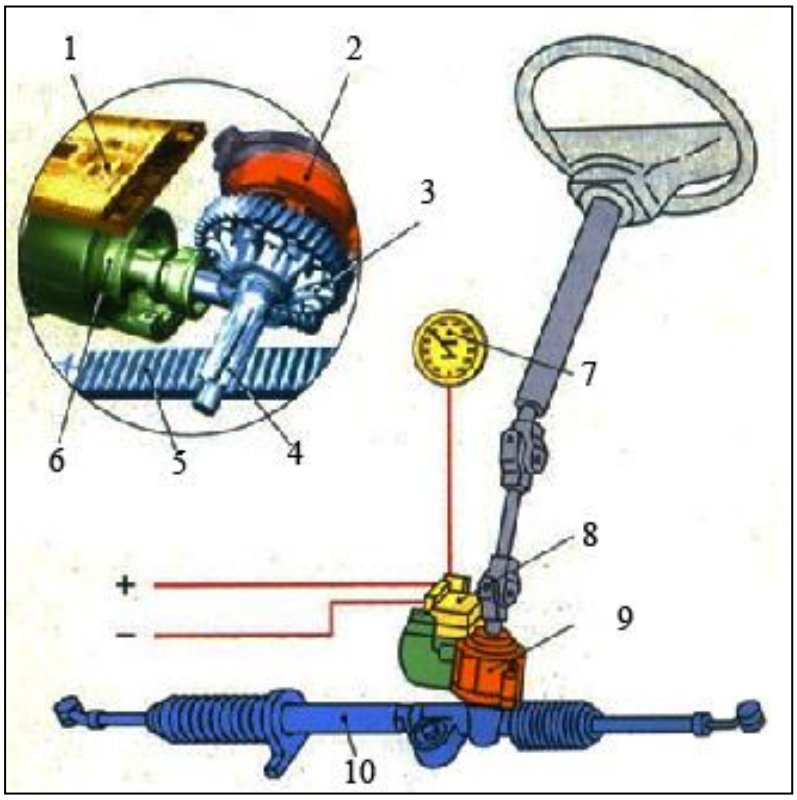
Question No 08

Part A

a. How is the McPherson axle constructed? Explain with aid of a sketch.
b. Explain single-tube gas pressure and twin-tube gas pressure with the help of suitable sketches.
c. The wheel base and track of a vehicle is 2.2m and 1.6m respectively. The outer wheel of this vehicle on a curve makes 16º 5' turn. What would be the angle through which the inner wheel turns? If the steering works correctly as per Ackerman principal.

Part B

a. Explain briefly the various types of chassis construction with the help of suitable diagrams.
b. How energy conversion done by a vibration damper.
c. Explain advantages and disadvantages compared to the conventional rigid axle suspension and independence suspension.
d. Name the parts of rack and pinion type Electric Power Steering (EPS).



Question No 09

Part A

a. Draw a graph for combine characteristic curve of coil-Spring and diaphragm-spring clutches
b. Explain engaging and disengaging forces acting on a clutch pedal on both cases.

c. A single plate friction clutch is having 9 springs each provides 600N force. Inner and outer diameters of the clutch plate are 140mm and 210mm respectively. If the coefficient of friction between clutch liner and pressure plate and clutch liner and fly wheel is 0.35. Calculate:
   i. The torque that could be transmitted by the clutch.
   ii. Recommended torque, if the factor of safety is taken 1.8.
d. What is purpose of having a differential on a vehicle? Explain briefly

Part B

a. A planetary gear set of automatic transmission has 36 teethes on ring gear and 18 teethes on sun wheel. What are the first and second gear ratios possible by this setup?
b. What could be the highest reverse gear ratio.
c. What are the advantages of having front transverse engine, front wheel drive power train on a motor vehicle? Explain briefly.
d. What is the advantage having offset axes (Hypoid drive) on final Drive?

Question No 10

Part A

a. Draw a line diagram of an Automobile Air conditioning System.
b. Draw simple saturated vapor compression refrigeration cycle on the pressure - enthalpy (p- h) chart.
c. Name three (03) type of compressor used for automobile air conditioning.
d. Give five (05) good characteristics of refrigerant.

Part B

a. What are the main components used for an automobile air conditioning cycle using with vapor compression system.
b. List out five (05) main processes should control of air, in order to comfort to human (or Passenger).
c. Draw simple (basic) electrical wiring diagram for automobile air conditioning system, using with FICD unit

Explain how to identify the “refrigerant Leak” in the auto Air conditioning system.