

KATHMANDU UNIVERSITY  
End Semester Examination [C]  
April, 2023

Marks Scored:

Level : B.E.

Course : MEPP 412

Year : IV

Semester: I

Exam Roll No. :

Time: 30 mins.

F.M. : 20

Registration No.:

Date :

09 Apr 2023

SECTION "A"

[20Q. × 1 = 20 marks]

Choose the most appropriate answer and **mark [X]** in the box.

- The material known as high carbon high copper chrome silicon cast steel is used for making \_\_\_\_\_.  
 Camshaft       Cylinder body       Cylinder head       Piston
- The process of removing the burnt gases from the engine cylinder by the fresh charge coming into the engine cylinder from the crankcase, is known as \_\_\_\_\_.  
 Cleaning       Priming       Scavenging       Detonation
- The correct flow of power through the drive train is \_\_\_\_\_.  
 Engine drive shafts, clutch, main shaft, counter shaft, final driven gear, wheels  
 Engine clutch, main shaft, counter shaft, final driven gear, drive shafts, wheels  
 Engine clutch, counter shaft, main shaft, final driven gear, drive shafts, wheels  
 Engine main shaft, counter shaft, clutch, final driven gear, drive shafts, wheels
- The oil pump is driven by the \_\_\_\_\_.  
 Camshaft       Crankshaft directly  
 Alternator shaft       Crankshaft via drive belt
- If clearance volume of I.C. engines is increased, the compression ratio will \_\_\_\_\_.  
 Increase       Decrease       Remain constant       Be doubled
- Clutch facings are usually attached to the plate by \_\_\_\_\_.  
 Steel rivets       Aluminum screws  
 Steel screws       Brass rivets
- The motion of the cam is transferred to the valves through \_\_\_\_\_.  
 Pistons       Rocker arms       Camshaft pulley       Valve stems
- Petrol that detonates easily is called \_\_\_\_\_.  
 Low octane petrol       High octane petrol  
 Unleaded petrol       Blended fuel
- The function of a second ring is that it is a \_\_\_\_\_.  
 Back up compression ring which will work in place of the top ring when it is broken  
 Compression ring and aids the top ring in sealing and cooling  
 Back up oil control ring which will work in place of the bottom ring when it is broken  
 Cushion ring which prevents piston slap and knock
- If a tyre is designated as 175/65 R-14 82-S, then the aspect ratio for the tyre is \_\_\_\_\_.  
 175       65       14       82

11. Which one of the following statement correctly describes the construction of a bevel gear type differential?
- The drive shafts are splined to the differential carrier.
  - The left side gear and the differential carrier rotate in constant unison.
  - The differential carrier houses differential pinion gears and side gears; each pinion gear meshes with a different side gear.
  - The differential carrier houses differential pinion gears and side gears.
12. Engine misfiring is likely to result from \_\_\_\_\_.
- Spark plug gap too small
  - Spark plug gap too wide
  - Vapours lock in the fuel only
  - Incorrect fuel air mixture
13. The basic purpose of providing caster angle on wheels is to \_\_\_\_\_.
- Prevent uneven tyre wear
  - Maintain directional control
  - Bring the road contact of the tyre under the point of load
  - Compensate for wear in the steering linkage
14. The function of a proportioning control valve (PCV) in a brake system is to \_\_\_\_\_.
- Ensure that equal pressure is supplied to the front and rear brakes throughout every braking operation
  - Reduce the brake fluid pressure when the brakes approach their lockup point
  - Cause less brake fluid pressure to act on the front brakes than on the rear brakes when the fluid pressure exceeds a predetermined level
  - Cause less brake fluid pressure to act on the rear brakes than on the front brakes when the fluid pressure exceeds a predetermined level
15. Which of the following parameter can be adjusted by modifying the tie rod attachment length?
- Camber
  - Caster
  - Toe
  - Steering gear ratio
16. A three way catalytic converter \_\_\_\_\_.
- Re-circulates exhaust gases
  - Burns fuel vapour gases
  - Reduces  $N_2$ ,  $H_2O$ , and  $CO_2$  emission levels
  - Removes  $CO$ ,  $HC$ , and  $NO_2$  from the exhaust gases passing through it
17. The timing belt is attached to the camshaft pulley and \_\_\_\_\_.
- Timing belt drive pulley
  - Distributor
  - Radiator fan pulley
  - Alternator pulley
18. The best fuels for compression ignition engines are \_\_\_\_\_.
- Straight chain paraffin
  - Aromatics
  - Branched chain paraffin
  - Naphthalene
19. The function of positive crankcase ventilation (PCV) system is that it \_\_\_\_\_.
- Mixes fuel with air
  - Promotes combustion by creating a swirling movement in the air-fuel mixture
  - Returns blow by gases from the crankcase to the intake system
  - Feeds blow by gases to the exhaust manifold
20. The discharged lead acid battery has on its plates \_\_\_\_\_.
- Lead peroxide ( $PbO_2$ )
  - Spongy lead ( $Pb$ )
  - Lead sulphate ( $PbSO_4$ )
  - Sulphuric acid ( $H_2SO_4$ )

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F. M. : 55

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SECTION "B"

Attempt *ALL* questions.

1. Describe with a suitable sketch two stroke cycle, spark ignition (SI) and compression ignition (CI) engine. How its indicator diagram differs? Explain. [5]
2. How can crankcase blowby be controlled? Illustrate your answer with diagrams. [5]
3. Explain briefly Elasto-hydrodynamic lubrication and boundary lubrication according to its application on automobile engine. [5]
4. Draw typical layout to explain the working principle of vacuum clutch. [5]
5. What are the components of the pneumatic over hydraulic braking system in modern automobile? Illustrate the components with labeled sketch. [5]
6. Explain, with help of labeled sketches the components of the splash and dry sump engine lubrication system in an automobile engine. [5]
7. Explain the working principle of Macpherson suspension system with sketch. [5]
8. State the function of a vibration damper and spurt hole in the connecting rod. Show all the components in sketch. [5]
9. What are the main components of the hydraulic power steering (HPS), the electric power hydraulic steering (EPHS), and the fully electric power steering (EPS)? Illustrate your answer with labeled diagrams. [7]
10. Describe the working of fuel deliver system of the electronic fuel injection system. Illustrate your answer with flow chat diagram of fuel flow. Differentiate between continuous fuel and sequential multiport injection. [8]