KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2018

Marks Scored:

Level: B. E.
Year : IV

Course : MEPP 412
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date : FEB 2 7 2018

SECTION "A"
[20 Q. × 1 = 20 marks]

Attempt *ALL* the questions (Select and mark [X] for most appropriate answer).

1. The advantage of having a tandem master cylinder arrangement in automobiles is that it
   [ ] enhances safety by serving two independent lines in a divided-line brake circuit
   [ ] enhances safety by activating the brakes using vacuum pressure in the event of brake fluid loss
   [ ] supplies equal fluid pressure to each line of a divided-line brake circuit, thereby preventing the brakes from dragging on one side
   [ ] boosts the brake fluid pressure to reduce the force required to depress the brake pedal

2. The gradient resistance to a vehicle having a mass of 980 kg moving on an incline of 10° is
   [ ] 1.6694 N [ ] 16.694 N [ ] 166.94 N [ ]1669.4 N

3. The materials used for cylinder block are
   [ ] cast iron and steel [ ] cast iron and aluminum alloy
   [ ] steel and aluminum alloy [ ] brass and steel

4. The size of engine cylinder is referred in terms of its
   [ ] diameter and bore [ ] displacement and efficiency
   [ ] bore and stroke [ ] bore and length

5. The lower cylindrical portion of the piston which improves piston cooling performance is called
   [ ] piston crown [ ] connecting rod [ ] piston pin boss [ ] piston skirt

6. The crankshaft of a typical in -line four cylinder engine has .....balance weight
   [ ] 4 [ ] 8 [ ] 12 [ ] 16

7. The valve tappet clearance is measured by
   [ ] screw pitch gauge [ ] engineering scale
   [ ] feeler gauge [ ] vernier caliper

8. The process of supplying the intake air to the engine cylinder at a pressure greater than the pressure of the surrounding atmosphere is known as
   [ ] supercharging [ ] priming [ ]scavenging [ ] cleaning

9. If the spark plug deposit indicates black coating of soot, it indicates that the engine has been generally operating on
[ ] too lean mixture
[ ] stoichiometric mixture
[ ] most economical mixture
[ ] too rich mixture

10. A four-cylinder engine has a capacity of 2.4 litres. The swept volume of one cylinder is
[ ] 400 cm^3 [ ] 600 cm^3 [ ] 1200 cm^3 [ ] 2400 cm^3

11. The valve overlap in four stroke petrol engines is approximately
[ ] 30° [ ] 60° [ ] 90° [ ]120°

12. The oil pump is driven by the
[ ] camshaft
[ ] alternator shaft
[ ] crankshaft via drive belt
[ ] crankshaft directly

13. The crankcase dilution means
[ ] dilution of fuel in the crankcase
[ ] dilution of oil by water in the crankcase
[ ] dilution of lubrication oil by fuel in the crankcase
[ ] dilution of mixture passing through crankcase in tow –stroke

14. The fuel pump of a programmed fuel injection (PFI) system operate for two seconds when the ignition is turned to the start position to
[ ] enable the pump's fault-diagnosis function to operate
[ ] warm up and lubricate the pump
[ ] supply a large amount of fuel and thereby create a choke effect
[ ] pressurize the fuel system before the engine is started

15. The component in the radiator of an automobile that increases the boiling point of water is
[ ] drain plug [ ] water jacket [ ] vacuum valve [ ] pressure cap

16. When the battery is half (50%) charged, the specific gravity of acid in a battery is usually
[ ] 0.74 [ ] 1.00 [ ] 1.12 [ ] 1.19

17. Clutch facings are usually attached to the plate by
[ ] steel rivets
[ ] brass rivets
[ ] aluminium screws
[ ] steel screws

18. In order to implement gear changes in the gear unit of an automatic transmission, a _____ is used.
[ ] synchronizer
[ ] planetary gear
[ ] magnetic clutch
[ ] hydraulic multi plate clutch

19. In vehicles with tilt steering, the steering column is pivoted in
[ ] upper bracket
[ ] lower bracket
[ ] tilt bracket
[ ] steering yoke joint

20. The included angle is the sum of the
[ ] camber and castor
[ ] castor and S.A.I
[ ] camber and S.A.I.
[ ] camber and toe-in

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FEB 2 7 2018

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Time : 2 hrs. 30 mins.

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F. M. : 55

SECTION "B"

Attempt *ALL* the questions.

1. Mention the material used for the following components of an IC engine.
Cylinder block, piston, piston ring, connecting rod, crankshaft, valves (inlet and exhaust) flywheel, camshaft, rocker arm. [5]

2. Name and explain the different types fuel injection systems for a SI engine with a neat diagram, illustrate its working principles. [5]

3. Describe the water cooling systems of an automobile engine. Explain the function of each components of water cooling system. [5]

4. Explain, with help of neat sketches the components of the splash and dry sump engine lubrication system in an automobile engine. [5]

5. How are the human being affected by the pollutants from the automotive? Explain in your own words. [5]

6. How clutch are classified? Explain in detail. [5]

7. Explain, with neat sketches the action of four speed and reverse gear in synchromesh gear box incorporating selector mechanism. [5]

8. Describe the working principle of power steering with schematic diagrams. [5]

9. Explain, with help of a neat and labeled diagrams types of independent suspension system used in front wheel of modern automobiles. [7]

10. Sketch the schematic arrangement of type of brakes and explain its working mechanism of each type of brake actuation systems. [8]