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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

MID TERM EXAMINATION

Odd Semester: 2021 - 22

Course Code: MEC1001

Course Name: Fundamentals of Automobile Engineering

Program & Sem: B.Tech & 2nd Sem

Date: 13/MAY/2022

Time: 1.30PM to 3.00PM

Max Marks: 50

Weightage: 25%

Instructions:

- (i) Read the all questions carefully and answer accordingly.
(ii) All questions are compulsory
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Part A [Memory Recall Questions]

Answer all the Questions. Each question carries six marks. (5Q x 03 M = 15 M)

Q.NO. 1. An engine, or motor, is a machine used to change energy into movement that can be used. The energy can be in any form. Common forms of energy used in engines are electricity, chemical (such as petrol or diesel) or heat. Brief five components of Diesel Engine.

(C.O.No.1) [knowledge]

Q.NO. 2. A car transmission, also known as the transmission system, is the mechanism by which power created by the engine is transferred to the driving wheels. This part of the vehicle is the most important in determining the power and functionality of your engine systems. Mention at least six parts of transmission system in an automobile.

(C.O.No.2) [knowledge]

Q.NO. 3 A Combustion Chamber is the area within the Cylinder where the fuel/air mix is ignited. As the Piston compresses the fuel/air mix and makes contact with the Spark Plug, the mixture is combusted and pushed out of the Combustion Chamber in the form of energy. Explain the valve timing using valve timing diagram with a neat sketch.

(C.O.No.1) [knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries ten marks. (2Qx10M = 20M)

Q.NO.4. The function and purpose of a propeller shaft is to transmit torque from a rotating driving shaft to a transmission system. Propeller shaft require a mode of driving mechanism in order to break the transmission of torque. Explain the working principle of propeller shaft with a schematic diagram.

(C.O.No.2) [Comprehension]

Q.NO.5. The function of any transmission is transferring engine power to the driveshaft and rear wheels (or axle half shafts and front wheels in a front-wheel-drive vehicle). Gears inside the transmission change the vehicle's drive-wheel speed and torque in relation to engine speed and torque. What is function of universal joint? Explain the general working principle of gear box with a neat sketch. (C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer all the Questions. Each question carries fifteen marks. (01Qx15M = 15M)

Q.NO.6. IC engine is a heat engine where the combustion of the air-fuel mixture occurs inside the combustion chamber that produces high temperature and high gas pressure. This gas pressure pushes the piston over a distance and transforms the chemical energy into thermal energy which is used for performing the mechanical work. Mention the principle components of IC engine and explain the working principle of four stroke cycle Diesel Engine with a neat sketch. (C.O.No.1) [Comprehension]



**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM EXAMINATION

Winter Semester: 2021 - 22

Course Code: MEC 1001

Course Name: Fundamentals of Automobile Engineering (OE-2)

Program & Sem: B.Tech & VI Sem / IV Sem / II Sem

Date: 1st July 2022

Time: 01:00 PM to 04:00 PM

Max Marks: 100

Weightage: 50%

Instructions:

- (i) *Read all the questions carefully and answer accordingly.*

Part A [Memory Recall Questions]

Answer all the Questions. Each question carries SIX marks.

(5Qx6M= 30M)

Q.NO 1. A motor vehicle, also known as motorized vehicle or automotive vehicle, is a self-propelled land vehicle, commonly wheeled, that does not operate on rails (such as trains or trams) and is used for the transportation of people or cargo. Brief the functions of Piston, Cylinder head and valves.
(C.O.No.1) [Knowledge]

Q.NO 2. Propulsion transmission is the mode of transmitting and controlling propulsion power of a machine. The term transmission properly refers to the whole drivetrain, including clutch, gearbox, prop shaft, differential, and final drive shafts. Brief the requirements of Propeller shaft and Differential drive.
(C.O.No.2) [Knowledge]

Q.NO 3. Internal combustion engine cooling uses either air or liquid to remove the waste heat from an internal combustion engine. For small or special purpose engines, cooling using air from the atmosphere makes for a lightweight and relatively simple system. Write the function of splash lubrication system with a neat sketch.
(C.O.No.3) [Knowledge]

Q.NO 4. Suspension systems must support both road holding/handling and ride quality, which are at odds with each other. Mention the major components of McPherson suspension system and its requirements.
(C.O.No.4) [Knowledge]

Q.NO 5. The steering system converts the rotation of the steering wheel into a swiveling movement of the road wheels in such a way that the steering-wheel rim turns a long way to move the road wheels a short way. Brief the requirements of steering system.
(C.O.No.5) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries TEN marks.

(4Qx10M=40M)

Q.NO 6. The steering column turns a large screw which meshes with the nut by recirculating balls. The nut moves a sector of a gear, causing it to rotate about its axis as the screw is turned; an arm attached to the axis of the sector moves the Pitman arm, which is connected to the steering linkage and thus steers the wheels. Explain Ackerman steering mechanism with a neat sketch.

(C.O.No.5) [Comprehension]

Q.NO 7. Suspension is the system of tires, tire air, springs, shock absorbers and linkages that connects a vehicle to its wheels and allows relative motion between the two. Suspension systems must support both road holding/handling and ride quality, which are at odds with each other. With a neat sketch explain the function of Leaf and coil spring suspension system.

(C.O.No.4) [Comprehension]

Q.NO 8. A brake is a mechanical device that inhibits motion by absorbing energy from a moving system. It is used for slowing or stopping a moving vehicle, wheel, axle, or to prevent its motion, most often accomplished by means of friction. Explain the working principle of drum brake with a neat sketch.

(C.O.No.3) [Comprehension]

Q.NO 9. The gearbox is a mechanical device used to increase the output torque or to change the speed (RPM) of a motor. The shaft of the motor is connected to one end of the gearbox and through the internal configuration of gears of a gearbox, provides a given output torque and speed determined by the gear ratio. Explain the working principle of Gear box with a neat sketch.

(C.O.No.2) [Comprehension]

Part C [Problem Solving Questions]

Answer both the Questions. Each question carries FIFTEEN marks.

(2Qx15M=30M)

Q.NO 10. An engine or motor is a machine designed to convert one or more forms of energy into mechanical energy. Available energy sources include potential energy, heat energy, chemical energy, electric potential and nuclear energy. Explain the working principle of Diesel Engine with a schematic diagram of all 4stroke position and valve timing diagram. (C.O.No.1) [Comprehension]

Q.NO 11. A chassis is the load-bearing framework of an artificial object, which structurally supports the object in its construction and function. Write the requirement of Chassis and briefly classify the same. (C.O.No.4) [Comprehension]



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(C.O.No.2) [knowledge]

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(C.O.No.1) [knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each question carries ten marks. (2Qx10M = 20M)

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Part C [Problem Solving Questions]

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