**Printed Page:- 04** **Subject Code:- AME0613**

**Roll. No:**

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**NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**

**(An Autonomous Institute Affiliated to AKTU, Lucknow)**

**B.Tech**

**SEM: VI - THEORY EXAMINATION (2023 - 2024 )**

**Subject: Vehicle Body Engineering**

**Time: 3 Hours** **Max. Marks: 100**

**General Instructions:**

**IMP:** *Verify that you have received the question paper with the correct course, code, branch etc.*

**1.** *This Question paper comprises of* **three Sections -A, B, & C.** *It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.*

**2.** *Maximum marks for each question are indicated on right -hand side of each question.*

**3.** *Illustrate your answers with neat sketches wherever necessary.*

**4.** *Assume suitable data if necessary.*

**5.** *Preferably, write the answers in sequential order.*

**6.** *No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.*



**SECTION A** **20**

**1. Attempt all parts:-**

1-a. The coefficient of friction for the clutch facing is approximately (CO1) 1

(a) 0.1

(b) 0.4

(c) 0.8

(d) 1.2

1-b. The cetane number of a Diesel fuel is a measure of (CO1) 1

(a) Volatility

(b) Viscosity

(c) Ignition quality

(d) Delay period

1-c. A traction control system (TCS) in automobiles controls the (CO2) 1

(a) Vibrations on the steering wheel

(b) Engine power during acceleration

(c) Torque that is transmitted by the tyres to the road surface

(d) Stopping distance in case of emergency

1-d. The component in the radiator of an automobile that increases the boiling point of water is (CO2) 1

(a) Drain plug

(b) Water jacket

(c) Vacuum valve

(d) Pressure cap

1-e. The characteristic that is enhanced by the use of cylinder sleeves is (CO3) 1

(a) Cooling efficiency

(b) Resistance to wear

(c) Lubrication performance

(d) None of these

1-f. The aspect ratio (expressed in percentage) of the tyre is defined as the ratio of (CO3) 1

(a) Section width to section height

(b) Section height to section width

(c) Wheel diameter to section height

(d) Wheel diameter to section width

1-g. The sequence in which the force is transmitted through a brake system when the brake pedal is depressed is (CO4) 1

(a) Brake pedal, master cylinder, brake lines, vacuum servo mechanism, brake pads

(b) Brake pedal, vacuum servo mechanism, master cylinder, brake lines, brake pads

(c) Brake pedal, master cylinder, vacuum servo mechanism, brake lines, brake pads

(d) Brake pedal, brake lines, vacuum servo mechanism, master cylinder, brake pads

1-h. The purpose of a thermostat in an engine cooling system is to (CO4) 1

(a) Prevent the coolant from boiling

(b) Allow the engine to warm up quickly

(c) Indicate the coolant temperature

(d) Pressurise the system to raise the boiling point

1-i. The ignition in a spark ignition engine takes place when the piston is (CO5) 1

(a) Exactly at the T.D.C. position on its compression stroke

(b) Approaching the T.D.C. position on its compression stroke

(c) Leaving the T.D.C. position on its compression stroke

(d) Approaching the T.D.C position on its exhaust stroke

1-j. The material generally used for cylinder sleeves is (CO5) 1

(a) Aluminium

(b) Ceramic

(c) Cast iron

(d) Fibre reinforced plastic

**2. Attempt all parts:-**

2.a. What is loading capacity in commercial vehicles? (CO1) 2

2.b. Give any two examples of glass reinforced plastics. (CO2) 2

2.c. What do you mean by vehicle body stress analysis? (CO3) 2

2.d. How cabin ergonomics is different from ergonomics? (CO4) 2

2.e. What are non deformable bodies? (CO5) 2

**SECTION B** **30**

**3. Answer any <u>five</u> of the following:-**

3-a. Define any three terms used in body building construction. (CO1) 6

3-b. Compare between car and commercial vehicles. (CO1) 6

3-c. What are the different properties of high strength composites? (CO2) 6

3-d. What are the different properties of load bearing plastics? (CO2) 6

3.e. How body structure is chosen for the vehicles? (CO3) 6

3.f. What are seat adjustment mechanisms? (CO4) 6

3.g. Why we are using a bumper system explain? (CO5) 6

**SECTION C** **50**

**4. Answer any <u>one</u> of the following:-**

4-a. Differentiate between angle of approach and angle of departure. (CO1) 10

4-b. How the seating arrangement is decided in cars and buses? (CO1) 10

**5. Answer any <u>one</u> of the following:-**

5-a. Differentiate between metal matrix composites and simple composites with examples and properties. (CO2) 10

5-b. Explain the difference between ABS and Styrene. (CO2) 10

**6. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 6-a. | Differentiate between symmetrical and longitudinal loads with diagrams. (CO3) | 10 |
| 6-b. | What are the various body optimization techniques for minimum drag? (CO3) | 10 |

**7. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 7-a. | Describe the various methods for improving the visibility of the driver. (CO4) | 10 |
| 7-b. | Describe the various factors affecting the critical speed for toppling and skidding? (CO4) | 10 |

**8. Answer any <u>one</u> of the following:-**

| | | |
|---|---|---|
| 8-a. | What is the basic physics involved in the impact between deformable bodies. (CO5) | 10 |
| 8-b. | Explain in details the passive restraint systems, why they are used, what is their purpose. (CO5) | 10 |