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Total No. of Questions : 09] **[Total No. of Pages : 01**

B. Tech. (Sem. – 6th)
VEHICLE DYNAMICS
SUBJECT CODE : AE – 308
Paper ID : [A0722]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:
1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section – A ***(10 × 2 = 20)***

Q1) a) What is free vibration?
b) What is meant by magnification factor?
c) What is natural frequency of vibration?
d) Define tractive effort.
e) What are the sources of vibration in an automobile?
f) What is oversteer?
g) Define camber.
h) What do you understand by directional stability?
i) What is the effect of dynamic balance?
j) Define spring rate.

Section – B ***(4 × 5 = 20)***

Q2) Discuss single degree, two degree and multi degree of freedom system with example.
Q3) What do you understand by orthogonality of mode shapes? Discuss.
Q4) A car using rack and pinion type steering gear has steering wheel of 300 mm diameter and pinion with 5 teeth of 10 mm pitch. Determine the effort required by each hand at the steering wheel to overcome a load of 600 N at the rack.
Q5) Discuss the effect of camber in the automobile.
Q6) Discuss the requirements of suspension system in automobiles.

Section – C ***(2 × 10 = 20)***

Q7) An engine is mounted on 4 rubber pads such that the static deflection is 5 mm. If the engine and coupling weigh 400 kg and above, what speed must the motor run for 90% isolation.
Q8) Discuss Holzer's method for closed couple system.
Q9) Write notes on :
(a) Roll axis
(b) Vibration absorber