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**B.E / B.TECH. DEGREE EXAMINATION, MAY 2023**

Fourth Semester

**AE18403 – AUTOMOTIVE CHASSIS***(Automobile Engineering)***(Regulation 2018A)****TIME: 3 HOURS****MAX. MARKS: 100**

- CO1** Compare the different types of chassis layout, frame, steering system and explain the front wheel geometry.
- CO2** Explain the concepts of driveline and its components.
- CO3** Select the rear axle, wheel, rim and tyre for a given vehicle.
- CO4** Compare the characteristics of different types of suspension springs and explain the construction/working of different types of suspension systems.
- CO5** Explain the construction/working of different types of braking systems and its components.

**PART - A (10 x 2 = 20 Marks)**

(Answer all Questions)

	CO	RBT LEVEL
1. Classify the vehicle with respect to power plant location and drive.	1	2
2. Why Ackermann steering mechanism is preferred over Davis steering mechanism?	1	2
3. What do you mean by critical speed of a propeller shaft? How whirling can be prevented?	2	2
4. Why do we need a final drive in a vehicle?	2	2
5. What are the various loads acting on the rear axle?	3	2
6. Decode the tyre specification 185/65 R15 88H.	3	3
7. Differentiate rigid axle suspension with that of independent suspension.	4	3
8. What is the function of shackle with a leaf spring?	4	2
9. What do you understand about leading shoes and trailing shoes.	5	2
10. What is meant by stopping distance? How it can be calculated?	5	2

**PART - B (5 x 14 = 70 Marks)**

	Marks	CO	RBT LEVEL
11. (a) With a neat sketch identify and discuss the salient features of the following layouts of a vehicle with their relative merits and demerits. i) Front engine rear wheel drive, ii) Front engine front wheel drive, iii) Rear engine rear wheel drive and iv) Four wheel drive or All wheel drive.	(14)	1	3

**(OR)**

- (b) Identify and explain any one type of steering system which reduces the efforts required by the driver and improves the maneuverability. **(14) 1 3**
- 12. (a)** Explain in detail about the construction and working of Hotchkiss drive and torque tube drive with neat sketches. **(14) 2 2**
- (OR)**
- (b) Identify the various types of gears used in final drive for automotive vehicles and explain with neat sketches of the same. **(14) 2 2**
- 13. (a)** Identify the various types of rear axle housing and discuss in detail with neat sketches. **(14) 3 2**
- (OR)**
- (b) Compare and discuss about the drum brake and disc brake in detail on its construction, working and its limitations with the aid of neat sketches, **(14) 3 2**
- 14. (a)** Explain the leaf spring suspension system and torsion bar spring suspension system. **(14) 4 2**
- (OR)**
- (b) Describe the construction and working principle of air suspension system with a neat sketch. **(14) 4 2**
- 15. (a)** Identify the braking system which are widely used in front wheels and explain the same in detail with neat sketches. **(14) 5 3**
- (OR)**
- (b) Identify the braking system which will not allows the wheels to get locked and eliminates skidding with better maneuverability of the vehicle and improves the safety. With the help of neat sketch explain in detail about the same. **(14) 5 3**

**PART - C (1 x 10 = 10 Marks)**

(Q.No.16 is compulsory)

- |   | <b>Marks</b> | <b>CO</b> | <b>RBT LEVEL</b> |
|---|--------------|-----------|------------------|
| <b>16.</b> Identify the system which allows the vehicles to negotiates the turn without any wheel slip by achieving the difference speed between inner wheel and outer wheels. Explain the same in detail with a neat sketch. | <b>(10)</b>  | <b>2</b>  | <b>3</b>         |