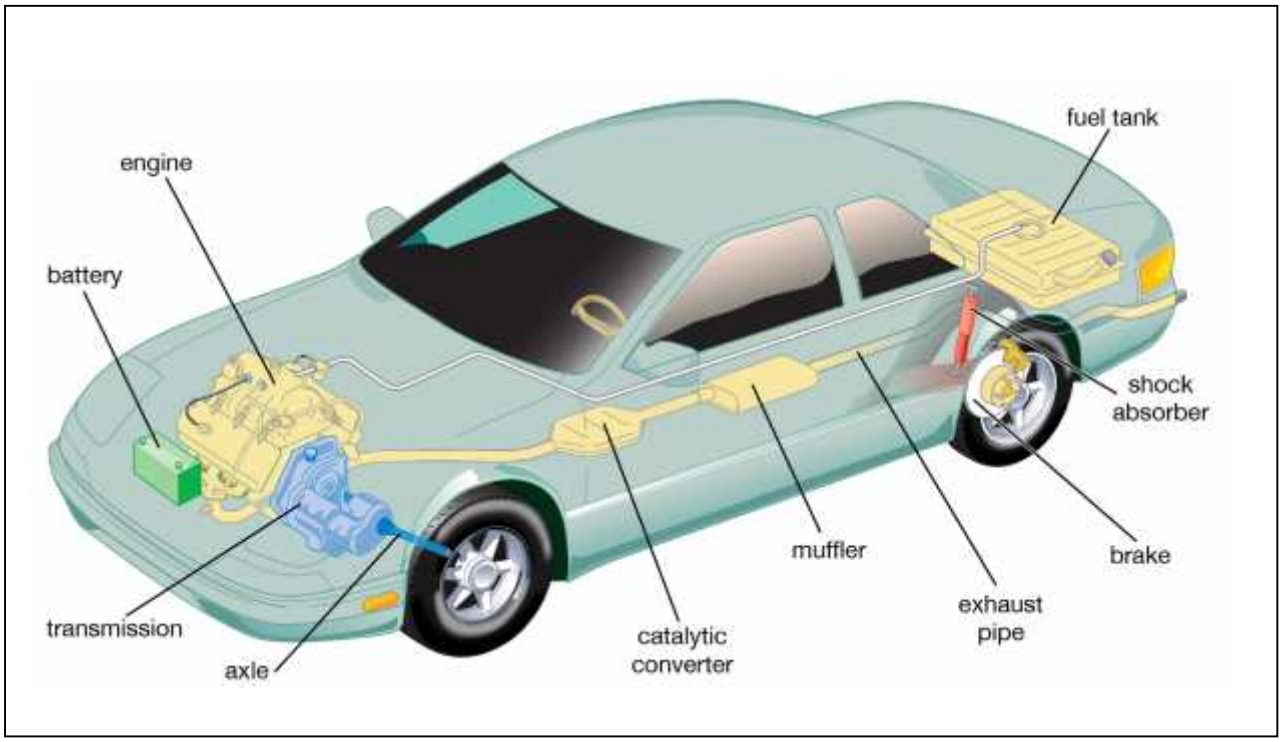
SREENIVASA INSTITUTE of TECHNOLOGY and MANAGEMENT STUDIES
(Autonomous)

(AUTOMOBILE ENGINEERING)

Question bank

II - B.TECH / II- SEMESTER regulation: r18



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SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES

(Autonomous)

DEPARTMENT of MECHANICAL ENGINEERING

QUESTION BANK — AUTOMOBILE ENGINNERING –II (18MEC224)

II B.Tech II Semester

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18MEC224 AUTOMOBILE ENGINEERING

Course Educational Objectives:

- To understand the construction and working principle of various systems of an automobiles.

UNIT – 1: VEHICLE STRUCTURE, ENGINES AND FILTERS

Vehicle Structure: Introduction - Components of an automobile - Basic structure - Power unit - Chassis, frames and body - Resistance to vehicle motion - Power transmission - Rear wheel drive, Front wheel drive and four wheel drive. **Automobile Engines:** Types - Construction - Components - Functions and materials - Turbo charging and super charging. **Filters:** Oil filters - Air filters - Fuel filters.

UNIT – 2: TRANSMISSION SYSTEM

Clutches: Requirements and types clutch - Principles of friction clutches - Dry friction and wet clutches - Clutch operations - Principles of fluid fly wheel - Trouble shooting. **Gear Box:** Function and necessity of transmission - Principles and features of sliding mesh, constant mesh, synchromesh, epi-cyclic gear box and torque converter - Over drive - Automated manual transmissions - Trouble shooting. **Drive Line:** Propeller shaft, universal joint, final drive (differential), rear axles and rear axle drives.

UNIT – 3: STEERING SYSTEM

Wheels and Tyres: Types of wheels - Tyre properties and types. **Front axle and steering:** Front axle - Wheel alignment - Factors of wheel alignment - Factors pertaining to wheels - Steering geometry - Center point steering - Steering mechanisms - Vehicle handling - Steering linkages - Steering gears - Power steering – Four wheel steering – Trouble shooting.

UNIT – 4: SUSPENSION AND BRAKING SYSTEM

Suspension System: Objects - Rigid axle suspension system - Torsion bar - Shock absorber - Independent suspension system – Air suspension system. **Braking System**: Drum and disc brake system, Mechanical brake system, hydraulic brake system, pneumatic and vacuum brake systems - Antilock braking system, electronic brake force distribution and traction control.

UNIT –5: EMISSION AND ELECTRICAL SYSTEM

Emission: Emission from automobiles - Pollution standards national and international - Pollution control - Techniques - Multipoint fuel injection for SI engines - Common rail diesel injection, emissions from alternative energy sources - Hydrogen, biomass, alcohols, LPG, CNG. **Electrical System:** Charging circuit, generator, and current-voltage regulator - Starting system, Bendix drive, and mechanism of solenoid switch, lighting systems, horn, wiper, fuel gauge, oil pressure gauge and engine temperature indicator - Working of engine management system - Intelligent lighting system Night vision system.

Course Outcomes:

On successful completion of the course the student will be able to,		POs related to COs
CO1	Acquired knowledge on vehicle components and basic construction	PO1, PO4
CO2	Synthesized the principles of transmission system in automobile, and identify the trouble shooting problems in transmission	PO1, PO2, PO3
CO3	Identified the steering system, wheel alignment and trouble shooting.	PO1, PO2 PO4,
CO4	Understand the functioning of suspension and braking system, identified the new technologies of braking system	PO1, PO3, PO4,PO5
CO5	Understand the emissions from automobile and analyzed the engine management system	PO1, PO3,PO7,PO12

Text Books:

1. Automobile Engineering-Vol.I and II, Kirpal Singh, 12/e, 2011 Standard Book House, New Delhi.
2. Automotive Mechanics, William Crouse, 10/e, 2006, Tata McGraw-Hill Education Pvt. Ltd., Noida.

Reference Books:

1. Automobile Engineering, R.K.Rajput, 1/e, 2007, Laxmi Publications (P) Ltd., New Delhi.
2. Automobile Engineering, K.K. Ramalingam, 2/e, 2003, Scitech Publishers, Chennai.
3. Automotive Engines, Newton, Steeds and Garret, Butterworth Publishers.
4. Internal Combustion Engines, V.Ganesan, 4/e, 2012, Tata McGraw-Hill Education Pvt. Ltd., Noida.
5. Automobile Engineering: Vol-I, P.S.Gill, 2011, S.K.Kataria and Sons Publications, New Delhi.

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DEPARTMENT of MECHANICAL ENGINEERING

QUESTION BANK — AUTOMOBILE ENGINNERING –II (18MEC224)

QUESTION NO	QUESTION	BLOOMS LEVEL
UNIT – I Vehicle Structure, Engines and Filters		
PART-A (Two Marks Questions)		
1	What is meant by self-propeller vehicle?	BT1
2	State the major types of automobiles according to the fuel used.	BT1
3	What are the functions of a frame?	BT1
4	What loads are coming to axle?	BT1
5	List any four components of a chassis.	BT1
6	What is meant by the term Chassis?	BT1
7	List any four characteristics of a good chassis.	BT1
8	Express the type of loads coming to axle.	BT2
9	Describe the various types of frames.	BT1
10	Describe the purpose of IC Engines.	BT2
11	Describe about cross wind force.	BT1
12	Name few components of engine.	BT1
13	What are the functions of piston rings? Types?	BT1
14	What are the functions of Turbo chargers?	BT1
15	What is super charging?	BT1
16	Define lift force.	BT1
17	Express about Vehicle Aerodynamics?	BT1
18	What is the use of air filters?	BT1
19	How does the oil filter work?	BT1
20	What are the signs that your fuel filter is bad?	BT1
PART-B (Ten Marks Questions)		
1	Draw the layout of an automobile and indicate the various components.	BT2
2	Describe the various chassis components of automobiles and discuss the advantages and disadvantages.	BT2
3	Explain the construction of various frames used in automobiles with neat sketch	BT2
4	Explain the various types of engine drives of automobiles and mention the merits and demerits of each drive	BT2
5	explain the various forces acting on the body and its aerodynamics affects	BT2
6	Classification of a vehicle chassis is based on the position of the engine on the chassis	BT2
7	Explain in detail about the various components of engine with neat sketches.	BT2
8	Explain the working principle of turbo charger with neat sketch.	BT2
9	Explain the working principle of super charger with neat sketch.	BT2
10	Explain the following filters briefly. (i) Air filter (ii) Oil fitter (iii) fuel filter	BT2
UNIT II Transmission Systems		
PART-A (Two Marks Questions)		
1	State the functions of transmission system.	BT1
2	What is the function of clutch?	BT1
3	What are the types of clutch?	BT1

4	State the requirements of an automotive clutch.	BT1
5	List the various parts of a single plate clutch.	BT1
6	Why multi-plate clutches are used in automobiles?	BT1
7	What is the use of synchronizer in the automotive transmission system?	BT1
8	Why is gear box necessary in automobile?	BT1
9	Give the function of a flywheel?	BT1
10	What is an over drive?	BT1
11	What is a universal joint? What are its types?	BT1
12	State the functions of a slip joint.	BT1
13	Explain the transfer box and its function?	BT1
14	What is the function of differential unit?	BT1
15	What is meant by differential lock?	BT1
16	Why is double clutching technique used?	BT1
17	Discuss the function of Universal joint?	BT1
18	List out the various function of propeller shaft.	BT1
19	Compare Hotchkiss drive and Torque Tube drive?	BT2
20	List down the types of liver rear axles.	BT1
PART-B (Ten Marks Questions)		
1	Explain the working principle of single plate clutch and multi plate with neat sketch.	BT2
2	Explain the working principle of cone clutch with neat sketch.	BT2
3	Explain the centrifugal clutch and semi-centrifugal clutch with neat sketch	BT2
4	Describe the working principle of fluid fly wheel with the help of a sketch	BT2
5	Illustrate the operation of a (i) sliding mesh gearbox (ii) constant mesh gearbox (iii) synchromesh gearbox	BT2
6	Explain the working of Epi-cyclic gear box with neat sketch	BT2
7	Explain the working of a Torque converter with suitable diagram.	BT2
8	Explain the working of Constant velocity universal joint.	BT2
9	Describe the construction and working of an over drive with a neat sketch and list out its advantages.	BT2
10	Explain the principle and working of a differential with a neat sketch.	BT2
11	Explain the types of rear axle drive with suitable sketch.	BT2
12	Explain in detail with neat sketches about Hotchkiss drive and torque tube drive	BT2
13	Explain in detail with neat sketches about final drive gears.	BT2
UNIT III –Steering Systems		
PART-A (Two Marks Questions)		
1	Define wheel track and wheel base	BT1
2	Give a brief note on damper.	BT1
3	Define steering gear.	BT1
4	What are the different types of tyres used in automobile?	BT1
5	Give the function of tyre?	BT1
6	Define tube vulcanization.	BT1
7	Classify wheels.	BT2
8	Write down the types of tread patterns in tyres.	BT1

9	What is meant by the term 'tread'?	BT1
10	Distinguish between disc brake with drum brake.	BT1
11	What are the different types of springs used in suspension system?	BT1
12	State the function of the steering gear box.	BT1
13	Define toe-in and toe-out.	BT1
14	Define castor and camber.	BT1
15	Define king pin inclination.	BT1
17	List out the types of stub axle.	BT1
18	What is the Ackermann principle of steering?	BT1
19	What is center point steering?	BT1
20	What is slip angle in steering?	BT1
PART-B (Ten Marks Questions)		
1	Discuss in detail about the different types of wheels and tires with respect to construction, advantages and disadvantages.	BT2
2	Explain the different types of stub axle with neat sketch.	BT2
3	Explain the wheel alignment, factors of wheel alignment and factors pertaining to wheels with neat sketch.	BT2
4	Sketch and explain various steering geometries.	BT2
5	Sketch and explain steering mechanism. Deduce an expression for true rolling of a steering wheel.	BT2
6	vehicle handling	BT2
7	Explain the steering linkage with suitable sketch.	BT2
8	What are the different types of steering gears? What is the purpose of steering gear? Explain with sketch of steering gears.	BT2
9	Explain the power steering system with neat sketch	BT2
10	Discuss the various troubles shooting in steering system.	BT2
UNIT IV Suspension and Braking Systems		
PART-A (Two Marks Questions)		
1	What are Objectives of vehicle Suspension System?	BT1
2	What are the Difference between Pitch, Roll, and Yaw?	BT1
3	What is meant by unsprung weight?	BT1
4	What is the function of shackle with a leaf spring?	BT1
5	What is the material used for leaf spring?	BT1
6	What forces are supported by a leaf spring?	BT1
7	State the advantages of a tapered leaf spring.	BT1
8	What is rigid axle suspension system?	BT1
9	What are the advantages of an independent suspension system over a rigid axle suspension?	BT1
10	What is the purpose of a shock absorber?	BT1
11	How do shock absorbers work?	BT1
12	What are the symptoms of bad shock absorbers?	BT1
13	Write its advantages and disadvantages of disc brake.	BT1
14	What is a common cause of premature ABS brake application?	BT1
15	What is the function of torsion bar?	BT1
16	What is independent suspension system?	BT1
17	What are the different types of suspension systems?	BT1
18	Why are hydraulic brakes better than mechanical?	BT1

19	What are the main differences between hydraulic and pneumatic brakes?	BT1
20	What is traction control?	BT1
21	What is the function of EBD system?	BT1
22	What is the difference between ABS and EBD?	BT1
PART-B (Ten Marks Questions)		
1	Explain in detail about suspension system with neat sketches.	BT2
2	Sketch and explain the working of torsion bar.	BT2
3	Explain the operation of a telescopic type shock absorber with a sketch.	BT2
4	Describe the working of front independent suspension system with neat sketch.	BT2
5	Explain the working air suspension system with neat sketch.	BT2
6	Describe the mechanical brake system with neat sketch.	BT2
7	Explain the working principles of hydraulic brake system with neat sketch	BT2
8	Explain the pneumatic or air brakes with neat sketch.	BT2
9	Sketch and explain the vacuum brake system.	BT2
10	Explain the anti-lock braking system with suitable sketch.	BT2
11	What is EBD (electronic brake force distribution) and how does it work?	BT2
12	Explain the traction control with suitable sketch.	BT2
UNIT V		
PART-A (Two Marks Questions)		
1	What are the alternative fuels?	BT1
2	List the advantages of hydrogen fuel used in automobiles.	BT1
3	What are the disadvantages of using alcohol as an alternative fuel?	BT1
4	How does the charging system work?	BT1
5	How does alternator charge the battery?	BT1
6	What causes charging system failure?	BT1
7	What are the symptoms of a bad alternator?	BT1
8	What is a voltage regulator and how does it work?	BT1
9	What is the need for voltage regulator?	BT1
10	What is the function of voltage regulator?	BT1
11	How does the starting system work?	BT1
12	What is the purpose of the starting system?	BT1
13	What are the main components of the starting system?	BT1
14	What is the purpose of the starting motor?	BT1
15	What are the components in the charging system?	BT1
16	What is bendix drive?	BT1
17	How solenoid does switch work?	BT1
18	What is the working principle of solenoid?	BT1
19	What are the symptoms of a bad starter solenoid?	BT1
20	What is the purpose of lighting?	BT1
21	What are the different types of lighting systems?	BT1
22	How does a horn system work?	BT1
23	How does a wiper system work?	BT1
24	What is fuel gauge?	BT1
25	How an oil pressure gauge works.	BT1
26	How the engine Temperature Sensor Work.	BT1
27	How does an ECU Work?	BT1

28	What are the symptoms of a bad engine control module?	BT1
29	What are the main components of engine management system?	BT1
	PART-B (Ten Marks Questions)	
1	Explain in detail about of engine emissions and emission standards.	BT2
2	Classify the different types of emission control device with suitable sketch.(Any two)	BT2
3	Explain the working of multi point fuel injection system for SI engines.	BT2
4	Explain the working of common rail fuel injection system for SI engines.	BT2
5	Explain the following alternative fuels (iv) Hydrogen (v) Bio mass (vi) Alcohols (vii) LPG (viii) CNG	BT2
6	Explain about Charging circuit ,Starting system in an automobile	BT2
7	Describe the mechanism of solenoid switch with neat sketch	BT2
8	Describe the working of a standard bendix drive used in starter motors.	BT2
9	Explain in detail about Lighting system	BT2
10	Explain the function and working of following electrical system. (ix) Horn (x) Wiper (xi) Fuel gauge (xii) Oil pressure gauge (xiii) Engine temperature indicator	BT2
11	Explain the working of engine management system.	BT2