



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

## MECHANICAL ENGINEERING

### QUESTION BANK

<b>Course Name</b>	: AUTOMOBILE ENGINEERING
<b>Course Code</b>	: A62405
<b>Class</b>	: III B. Tech II Semester
<b>Branch</b>	: Mechanical Engineering
<b>Year</b>	: 2015 – 2016
<b>Course Faculty</b>	: USP Rao, Professor. Dr.CH V K N S N Moorthy, Professor

### OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

### SHORT ANSWER QUESTIONS

S. No	Question	Blooms Taxonomy Level	Course Outcome
<b>UNIT – I</b>			
1	What are the four basic components of the automobile structure?	Remembering, Understanding	1
2	What is the purpose of gear box in an automobile?	Remembering, Understanding	1
3	What is the reason for distortion of frame to parallelogram shape?	Remembering, Understanding	1
4	How the carbon from the cylinder head is removed?	Remembering, Understanding	1
5	When should the overhauling of the engine is to be done?	Remembering, Understanding	1
6	What is the friction that occurs between the layers of oil in an oil film?	Remembering, Understanding	1
7	What is the primary function of the lubrication?	Remembering, Understanding	2
8	What is the important characteristic of lubricating oil?	Remembering, Understanding	2
9	What is the most commonly used lubrication system in an automobile?	Remembering, Understanding	2
10	What is the most widely used fuel supply system for car engines?	Remembering, Understanding	2
11	What is the source of the drive for a mechanical fuel pump in an engine?	Remembering, Understanding	1

S. No	Question	Blooms Taxonomy Level	Course Outcome
12	What is the use of venturi in the carburettor?	Remembering, Understanding	1
13	When will the engine choke is closed?	Remembering, Understanding	1
14	Which is the most accurate petrol injection system?	Remembering, Understanding	1
15	What is the compression ratio in an automotive diesel engine?	Remembering, Understanding	1
16	Where is the fuel feed pump in a diesel engine is mounted?	Remembering, Understanding	1
17	What is the approximate value of the cranking compression pressure in a diesel engine?	Remembering, Understanding	2
18	What is the approximate value of the temperature after compression in a diesel engine?	Remembering, Understanding	2
19	What is the ignition temperature of diesel fuel?	Remembering, Understanding	2
20	How the fuel injection timing in a distributor type pump is controlled?	Remembering, Understanding	2
<b>UNIT – II</b>			
1	What is the approximate percentage of utilization of the heat in the engine for the useful work?	Remembering, Understanding	1,2
2	What is the approximate percentage of loss of fuel energy to the cylinder walls?	Remembering, Understanding	1,2
3	Write the sequence of the coolant circulation	Remembering, Understanding	1,2
4	What is the purpose of the thermostat?	Remembering, Understanding	1,2
5	In general what is the type of coolant pumps used?	Remembering, Understanding	1,2
6	How the cooling fans are driven?	Remembering, Understanding	1,2
7	What are the three components of primary ignition circuit?	Remembering, Understanding	1,2
8	What are the components of the secondary ignition circuit?	Remembering, Understanding	1,2
9	What is the material generally used for the contact breaker points?	Remembering, Understanding	1,2
10	What is 'dwell'?	Remembering, Understanding	1,2
11	What is the result of excessive contact breaker gap?	Remembering, Understanding	1,2
12	How the contact breaker points are opened?	Remembering, Understanding	1,2
13	How the contact breaker points are closed?	Remembering, Understanding	1,2
14	Which device is used to set the accurate contact breaker gap?	Remembering, Understanding	1,2
15	When will the vacuum advance mechanism is operated?	Remembering, Understanding	1,2
16	How the life of a spark plug of two stroke engine and four stroke engines is related with each other?	Remembering, Understanding	1,2
17	What is the significance of spark plug having white insulator?	Remembering, Understanding	1,2
18	What is the significance of spark plug with a black centre?	Remembering, Understanding	1,2
19	What are the three units contained in a regulator for automobile d.c. generator?	Remembering, Understanding	1,2
20	What is the use of thermister in an alternator regulator?	Remembering,	1,2

S. No	Question	Blooms Taxonomy Level	Course Outcome
		Understanding	
<b>UNIT – III</b>			
1	What is the purpose of transmission in an automobile?	Remembering, Understanding	1, 3
2	How to increase the torque in a vehicle?	Remembering, Understanding	1, 3
3	What are the advantages of using helical gears rather than spur gears in a transmission?	Remembering, Understanding	1, 3
4	What is the use of synchronizing device?	Remembering, Understanding	1, 3
5	In a simple planetary gear set what is the output member and why it is used?	Remembering, Understanding	1, 3
6	In simple epicyclic gear set what is the output member and why it is used?	Remembering, Understanding	1, 3
7	What is the name of the central gear of an epicyclic gear set?	Remembering, Understanding	1, 3
8	Which component in the torque converter allows multiplication of the torque?	Remembering, Understanding	1, 3
9	Which component in the torque converter drives the oil?	Remembering, Understanding	1, 3
10	When will the maximum torque multiplication occurs in a torque converter?	Remembering, Understanding	1, 3
11	What is the shape of the blades in a torque converter?	Remembering, Understanding	1, 3
12	With respect to suspension system when will the vehicle ride will be comfortable?	Remembering, Understanding	1, 3
13	What is the function of a stabilizer in an automobile?	Remembering, Understanding	1, 3
14	What is the use of Panhard rod?	Remembering, Understanding	1, 3
15	What is the function of a shackle with a leaf spring?	Remembering, Understanding	1, 3
16	What is used for lining of spring eyes in case of cars?	Remembering, Understanding	1, 3
17	What is the use of zinc liners between the leaves of spring?	Remembering, Understanding	1, 3
18	What is the other name of torsion bar?	Remembering, Understanding	1, 3
19	What is the use of shock absorber in an automobile?	Remembering, Understanding	1, 3
20	Where is the coil spring is placed in the wishbone suspension?	Remembering, Understanding	1, 3
<b>UNIT – IV</b>			
1	What is the general break efficiency of a new vehicle?	Remembering, Understanding	1,4
2	What is the brake fade?	Remembering, Understanding	1,4
3	Why fading of brakes occur?	Remembering, Understanding	1,4
4	What is the ratio of braking effect at the front and at the rear wheels due to weight transfer?	Remembering, Understanding	1,4
5	How usually the brakes employed in cars are operated?	Remembering, Understanding	1,4
6	Which component of the wheel cylinder seals the brake fluid?	Remembering, Understanding	1,4
7	What is the use of push rod during braking?	Remembering, Understanding	1,4
8	In drum type brakes why the fluid on releasing, returns to the master	Remembering,	1,4

S. No	Question	Blooms Taxonomy Level	Course Outcome
	cylinder?	Understanding	
9	What is the use of intake port in the master cylinder?	Remembering, Understanding	1,4
10	When will the proportioning valve does not work?	Remembering, Understanding	1,4
11	Where are the most anti-skid devices employed?	Remembering, Understanding	1,4
12	In disc brakes, why pad-to-disc adjustment is provided?	Remembering, Understanding	1,4
13	What is the function of brake bleeding process?	Remembering, Understanding	1,4
14	What are the types of brakes generally used on front and on rear of Maruti car?	Remembering, Understanding	1,4
15	Where generally the electric brakes are used?	Remembering, Understanding	1,4
16	On suspended vacuum brakes, when will the vacuum present on both sides of the piston?	Remembering, Understanding	1,4
17	In which vehicles generally air brakes are used?	Remembering, Understanding	1,4
18	Hand brake is used on which wheels?	Remembering, Understanding	1,4
19	What is the main component of the material of the brake lining?	Remembering, Understanding	1,4
20	What is the maximum disc runout allowed on the vehicle?	Remembering, Understanding	1,4
<b>UNIT – V</b>			
1	What are the main pollutants in the engine exhaust?	Remembering, Understanding	1, 5
2	What are the approximate maximum allowable hydrocarbons in the car emission?	Remembering, Understanding	1, 5
3	Define ppm.	Remembering, Understanding	1, 5
4	What is the limit of the percentage of the CO in the exhaust of a car engine?	Remembering, Understanding	1, 5
5	Where is the PCV valve located?	Remembering, Understanding	1, 5
6	What is PCV valve?	Remembering, Understanding	1, 5
7	What is the function of PCV valve?	Remembering, Understanding	1, 5
8	What is the position of the PCV valve plunger at idle speed?	Remembering, Understanding	1, 5
9	What is the function of the charcoal granules?	Remembering, Understanding	1, 5
10	Where is the liquid-vapour separator located?	Remembering, Understanding	1, 5
11	Why EGR system is employed?	Remembering, Understanding	1, 5
12	What is EGR system?	Remembering, Understanding	1, 5
13	What is the type of the pump for the air injection system?	Remembering, Understanding	1, 5
14	What is the main purpose of the diverter valve in the air injection system?	Remembering, Understanding	1, 5
15	What is the catalyst used in the reduction converter?	Remembering, Understanding	1, 5
16	What is the catalyst used in the converter for oxidising HC and CO?	Remembering, Understanding	1, 5

S. No	Question	Blooms Taxonomy Level	Course Outcome
17	What is controlled by the first converter in a three way converter?	Remembering, Understanding	1, 5
18	What is the air fuel ratio required for the efficient operation of a three way converter?	Remembering, Understanding	1, 5
19	What does the amount of oxygen in the exhaust indicate?	Remembering, Understanding	1, 5
20	What is 'catalyst operating window'?	Remembering, Understanding	1, 5

## LONG ANSWER QUESTIONS

S. No	Question	Blooms Taxonomy Level	Course Outcome
<b>UNIT – I</b>			
1	Describe the working of crescent type gear pump and Rotor pump with neat sketches?	Comprehension	1
2	What are the requirements of lubricants?	Knowledge, Comprehension	1
3	Explain clearly Splash Lubrication system?	Analysis, Comprehension Knowledge	1
4	Explain piston rings function, materials, number of rings clearly.	Knowledge, Analysis	1
5	What is Four wheel drives? Explain.	Knowledge	1
6	How A.C mechanical pump pumps the fuel ?	Knowledge, Comprehension	1
7	How Petrol can be injected according to location?	Knowledge, Comprehension	2
8	What are the functions of a carburettor?	Knowledge, Comprehension	2
9	Explain common rail fuel injection system.	Knowledge, Comprehension	2
10	Draw the schematic diagram of electronic petrol injection system.	Knowledge, Comprehension	2
11	Draw the layout of four wheels automobile and indicate major components.	Comprehension	1
12	Discuss briefly about gear pump and vane pump.	Knowledge, Comprehension	1
13	What are the objects of lubrication?	Analysis, Comprehension Knowledge	1
14	Draw and Explain pressure lubrication system?	Knowledge, Analysis	1
15	Explain the working principle of simple carburettor	Knowledge	1
16	Explain the working of nozzle and different types of nozzle.	Knowledge, Comprehension	1
17	Explain fuel injection pump in CI engines.	Knowledge, Comprehension	2
18	How valves are serviced?	Knowledge, Comprehension	2
19	What are the defects in simple carburettor?	Knowledge, Comprehension	2
20	How air is cleaned in engines?	Knowledge, Comprehension	2
<b>UNIT – II</b>			
1	Draw the charging Circuit and explain the principle of a D.C Generator.	Knowledge,	1,2

S. No	Question	Blooms Taxonomy Level	Course Outcome
		Comprehension	
2	Draw and explain standard Bendix drive (or) Folothru drive	Knowledge, Comprehension	1,2
3	What are the requirements of Iginitaion System?	Knowledge, Comprehension	1,2
4	Explain current and voltage regulator with neat sketch.	Knowledge, Analysis	1,2
5	Explain pulse generator with sketch?	Knowledge, Comprehension	1,2
6	Draw and explain contact breakers?	Analysis, Comprehension	1,2
7	Explain what is spark advance?	Knowledge, Comprehension	1,2
8	What are the main requirements of a charging system	Knowledge, Comprehension	1,2
9	Describe the working of a fuel guage.	Knowledge, Comprehension	1,2
10	Explain the construction of D.C Generator.	Knowledge, Comprehension	1,2
11	Explain the principle of electrically operated oil pressure guage.	Comprehension	1,2
12	Explain the working of a Horn.	Knowledge, Comprehension	1,2
13	Explain the different types of thermostats used in automobile?	Knowledge, Comprehension	1,2
14	Explain in detail the type of cooling pump used in water cooling system?	Knowledge, Comprehension	1,2
15	Compare battery ignition system with magneto ignition system?	Knowledge, Analysis	1,2
16	Draw and explain wind screen wiper.	Knowledge, Comprehension	1,2
17	How overrunning clutch is used as starting device?	Analysis, Comprehension	1,2
18	Describe magneto ignition system with sketch?	Knowledge, Comprehension	1,2
19	How we can control generator output by the third brush.	Knowledge, Comprehension	1,2
20	Explain centrifugal advance method in automatic ignition advance method?	Knowledge, Comprehension	1,2
21	Explain battery ignition system with neat sketch?	Knowledge, Comprehension	1,2
22	Explain starting motor wiring circuit using a solenoid shift with relay.	Comprehension	1,2
<b>UNIT – III</b>			
1	What are the requirements of a clutch?	Knowledge, Comprehension	1, 3
2	How clutch can be operated electromagnetically?	Knowledge, Comprehension	1, 3
3	Explain with a neat sketch how Multi plate clutch can be constructed?	Knowledge, Comprehension	1, 3
4	Explain with a neat sketch the principle of differential?	Knowledge, Comprehension	1, 3
5	What are the Desirable properties of tyres?	Comprehension	1, 3
6	Explain vertical guide suspension with sketch?	Knowledge, Comprehension	1, 3
7	How stabilizer bar works? Explain with a neat sketch.	Knowledge	1, 3
8	Explain taper lite spring with a neat sketch.	Knowledge,	1, 3

S. No	Question	Blooms Taxonomy Level	Course Outcome
		Comprehension Analysis	
9	Sketch and explain different types of leaf springs.	Knowledge, Comprehension Analysis	1, 3
10	What are the types of Rubber springs? Explain with a neat sketch.	Knowledge, Comprehension	1, 3
11	Explain the principle of centrifugal clutch with neat sketch.	Knowledge, Comprehension	1, 3
12	Explain working of a synchro mesh gear box with sketch.	Knowledge, Comprehension	1, 3
13	What are the various problems encountered on wheels and tyres? How they can be eliminated?	Knowledge, Comprehension	1, 3
14	Differentiate between the torque tube and Hotch kiss drive.	Knowledge, Comprehension	1, 3
15	Explain the construction of fluid fly wheel and write the advantages and disadvantages.	Comprehension	1, 3
16	Explain the construction and working of a telescopic type of shock absorber.	Knowledge, Comprehension	1, 3
17	Explain the purpose of shackle in leaf spring mounting with a neat sketch?	Knowledge	1, 3
18	What are the objectives of employing suspension on an automobile?	Knowledge, Comprehension Analysis	1, 3
19	Sketch and explain the construction and working of wishbone type independent front suspension.	Knowledge, Comprehension Analysis	1, 3
20	Explain Air suspension with a neat sketch.	Knowledge, Comprehension	1, 3
<b>UNIT – IV</b>			
1	What is meant by bleeding of brakes?	Knowledge, Comprehension	1,4
2	What is brake adjustment? When is it required?	Knowledge, Analysis	1,4
3	Define camber, castor. Explain with a neat sketch.	Knowledge, Comprehension	1,4
4	Define king pin inclination. Explain with a neat sketch.	Knowledge	1,4
5	What is meant by Toe-in or Toe-out? Explain with a neat sketch.	Knowledge, Comprehension	1,4
6	Explain Rack and pinion steering gear with neat sketch.	Knowledge, Comprehension Analysis	1,4
7	Draw and explain worm and nut type steering gear.	Comprehension Analysis	1,4
8	Derive an equation for the condition for correct steering mechanism?	Knowledge, Comprehension	1,4
9	Explain different types of steering gears.	Knowledge	1,4
10	How worm and wheel steering gear mechanism works?	Knowledge, Comprehension	1,4
11	What are the advantages of power steering?	Knowledge, Comprehension	1,4
12	Sketch and explain the construction and working of Ackermann steering mechanism.	Knowledge, Analysis	1,4
13	Explain self righting torque.	Knowledge, Comprehension	1,4
14	Explain special steering columns.	Knowledge	1,4
15	Describe the working of a power steering unit with a neat sketch.	Knowledge,	1,4

S. No	Question	Blooms Taxonomy Level	Course Outcome
		Comprehension	
16	How hydraulic brake works? Explain with a neat sketch.	Knowledge, Comprehension Analysis	1,4
17	Describe the steering linkage for vehicle with rigid axle front suspension.	Comprehension Analysis	1,4
18	Explain the construction and working of Davis steering gear mechanism.	Knowledge, Comprehension	1,4
19	How recirculating ball type steering gear is working. Explain with sketch.	Knowledge	1,4
20	Describe steering linkage for vehicle with independent front suspension.	Knowledge, Comprehension	1,4
<b>UNIT – V</b>			
1	How emissions reduced by positive crank case ventilation?	Knowledge	1, 5
2	What is a multi point fuel injection system for S.I engines	Knowledge, Comprehension	1, 5
3	Explain vacuum advance method in automatic ignition advanced method?	Knowledge, Comprehension	1, 5
4	What are the advantages of CNG ?	Knowledge, Comprehension	1, 5
5	What are the advantages of L.P.G?	Knowledge, Comprehension	1, 5
6	Explain the operation of exhaust gas analyser.	Knowledge, Comprehension	1, 5
7	Explain the working of positive crank case ventilation (PCV) with PCV valve.	Analysis, Comprehension	1, 5
8	How hydrogen fuel is utilised as alternative fuel?	Knowledge	1, 5
9	What is exhaust gas recirculation (EGR)? How EGR valve works?	Knowledge	1, 5
10	How air injection systems reduce pollution?	Knowledge	1, 5
11	How fuel tank carburetor ventilation reduces the pollutants?	Knowledge	1, 5
12	Explain the working of catalytic converter?	Knowledge, Comprehension	1, 5
13	Explain the two types of techniques for treating the exhaust gases to reduce the pollutants?	Knowledge, Comprehension	1, 5
14	Explain the methods for reducing emissions from automobile.	Knowledge, Comprehension	1, 5
15	How common rail fuel injection system in Diesel engines works.	Knowledge, Comprehension	1, 5
16	What are the advantages and disadvantages of Bio-diesel?	Knowledge, Comprehension	1, 5
17	Explain clearly how the proper design of combustion chamber help in reducing exhaust emission	Analysis, Comprehension	1, 5
18	What are the main pollutants from the engine exhaust and mention its effects on the living organisms.	Knowledge	1, 5
19	How diesel catalytic converter-cum-particulate trap reduce pollutants?	Knowledge	1, 5
20	Explain unheated lambda probe with neat sketch.	Knowledge	1, 5

### ANALYTICAL QUESTIONS

S. No	Question	Blooms Taxonomy Level	Course Outcome
<b>UNIT – I</b>			
1	How resistance to wind can be reduced for automobiles?	Analyzing	1
2	Compare front engine and rear engine vehicles	Analyzing	1
3	Compare two wheel drive and four wheel drive vehicles.	Analyzing	1
4	Compare petrol and diesel engines for automobile applications	Analyzing	1



S. No	Question	Blooms Taxonomy Level	Course Outcome
5	Compare single cylinder and 3-cylinder engine of same power for automobiles.	Analyzing	1
6	Compare electrical vehicle with petrol vehicle.	Analyzing	1
7	Compare series and parallel hybrid systems.	Analyzing	2
8	How petrol injection improve the efficiency of engine?	Analyzing	2
9	Analyze the merits of pre lubrication system	Analyzing	2
10	Compare carburettor system with direct petrol injection.	Analyzing	2
<b>UNIT – II</b>			
1	Compare intelligent cooling with conventional cooling. How intelligent cooling systems improve engine performance?	Analyzing	1,2
2	How electronic ignition systems improve the performance of engine?	Analyzing	1,2
3	How automatic ignition advance result in higher efficiency?	Analyzing	1,2
4	Compare battery and magneto ignition systems	Analyzing	1,2
5	Analyze the performance of D-C generator and alternator for automobile application	Analyzing	1,2
6	Why alternator do not require cut-out relay and current regulator?	Analyzing	1,2
7	Compare Folo-thru and bendix drive starting mechanism	Analyzing	1,2
8	Compare centrifugal and vacuum spark advance and retard mechanisms	Analyzing	1,2
9	Explain the advantage of a solenoid switch compared to the manual type	Analyzing	1,2
10	What are the considerations on which the size of starting motor depend?	Analyzing	1,2
<b>UNIT – III</b>			
1	Compare friction clutch and fluid flywheel	Analyzing	1, 3
2	Compare sliding mesh and synchro mesh gear boxes	Analyzing	1, 3
3	How epicyclic gears are used for automatic transmission	Analyzing	1, 3
4	Compare tubeless tyre with conventional tyre	Analyzing	1, 3
5	Compare torque tube and conventional propeller shaft	Analyzing	1, 3
6	Compare rigid axle and independent suspension	Analyzing	1, 3
7	Compare air suspension with spring suspension	Analyzing	1, 3
8	What are advantages and disadvantages of auto transmission?	Analyzing	1, 3
9	What is clutch free pedal play? Explain with neat sketch mentioning how much it is kept at the clutch pedal?	Analyzing	1, 3
10	Discuss about what happens if clutch free pedal play is excessive	Analyzing	1, 3
<b>UNIT – IV</b>			
1	Explain why the master cylinder is not filled completely with the braking fluid	Analyzing	1,4
2	Why drum type hydraulic brakes are so designed that there should be residual pressure in the brake lines even when the brakes are in the released position?	Analyzing	1,4
3	Out of the disc and the drum brakes, which have better anti-fade characteristics? explain	Analyzing	1,4
4	What are the advantages of using synthetic resin adhesives for attaching brake linings as compared to the conventional riveting?	Analyzing	1,4
5	If only the brake on one of the four brake drums is incorrectly adjusted, how does it affect braking performance?	Analyzing	1,4
6	Out of the camber and the castor, which is measured first and out of their angle which is adjusted first why?	Analyzing	1,4
7	What should be the approximate amount of the following in a car: camber, kingpin inclination, included angle, castor and toe-in?	Analyzing	1,4
8	What is the meaning of the terms wander and shimmy in steering and how are thy caused?	Analyzing	1,4
9	If the kingpin and the wheel centre lines meet below the ground, will the wheels try to toe-in?	Analyzing	1,4
10	Why are the teeth on the nut in the recirculating ball type steering gear	Analyzing	1,4

S. No	Question	Blooms Taxonomy Level	Course Outcome
	made tapered?		
<b>UNIT – V</b>			
1	Why does the three – way converter not work in case of diesel engines?	Analyzing	1, 5
2	At what air-fuel ratio does the three – way converter operate at maximum efficiency? How is this ratio achieved precisely?	Analyzing	1, 5
3	Why should unleaded gasoline be used for engines employing catalytic converters?	Analyzing	1, 5
4	Compare the catalytic converter method with blowing of air only into the exhaust manifold	Analyzing	1, 5
5	How does PCV valve protect crankcase from engine backfiring?	Analyzing	1, 5
6	If the opening temperature for the thermostat valve in the engine cooling system is raised, how does it affect the pollution?	Analyzing	1, 5
7	How does an electric – assist type of choke help decrease the emission of pollutants?	Analyzing	1, 5
8	How does the fuel-air ratio affect the exhaust emission idle?	Analyzing	1, 5
9	How does the fuel injection help to reduce automobile pollution?	Analyzing	1, 5
10	What happens when at higher speeds the crankcase emissions exceed the flow rating of the PCV valve?	Analyzing	1, 5

**HOD, MECHANICAL ENGINEERING**

