Automotive Engineering VTU CBCS Question Paper Set 2018

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10ME844

Eighth Semester B.E. Degree Examination, Dec.2014/Jan.2015

Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the various methods of cylinder arrangements used in multicylinder engine. **(08 Marks)**

b. With neat sketches, explain the construction and purpose of dry and wet liners. **(08 Marks)**

c. What are the requirements while designing combustion chamber for SI engine? **(04 Marks)**

2 a. Briefly explain some of the alternative fuels than can be used for IC engines. **(04 Marks)**

b. Discuss briefly the mixture requirements for steady state operation of an SI engine. **(08 Marks)**

c. With neat sketch, explain the working of electronic fuel injection system. **(08 Marks)**

3 a. Explain the purpose of supercharging. **(04 Marks)**

b. With neat sketch, explain any two types of superchargers. **(08 Marks)**

c. Give the complete comparison between mechanical supercharging and turbo-charging. **(08 Marks)**

4 a. What are the requirements of an ignition system? **(04 Marks)**

b. Explain the working of:
i) Rotating armature type and
ii) Rotating magneto ignition system **(08 Marks)**

c. Explain the purpose of providing ignition advance with the parameters that affect the ignition advance. **(08 Marks)**

PART – B

5 a. Explain the principle of friction clutches. **(04 Marks)**

b. With sketch explain the working of single plate clutch. **(08 Marks)**

c. What is the principle of over drive? With sketch, explain how overdrive is employed in transmission. **(08 Marks)**

6 a. Write a short note on propeller shaft. **(04 Marks)**

b. With neat sketch, explain the forces and torque experienced by rear axle. **(08 Marks)**

c. Explain the effect of following on steering:
i) Camber ii) King pin angle iii) Included angle iv) Castor **(08 Marks)**

7 a. With a neat sketch, explain the working of telescopic type shock absorber. **(08 Marks)**

b. Give comparison between disc brakes and drum brakes. **(06 Marks)**

c. Explain the working of power brake system with neat sketch. **(06 Marks)**

8 a. Briefly explain the different types of emissions from IC engines. **(06 Marks)**

b. Explain the evaporative emission control systems. **(08 Marks)**

c. What are catalytic converters? Briefly explain the reduction of emissions by using catalytic converters. **(06 Marks)**

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Automotive Engineering

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Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With a neat sketch explain the overhead valve actuating mechanism. **(08 Marks)**

b. Explain dry sump lubrication system with sketch. **(08 Marks)**

c. Bring out at least 4 differences between Dole thermostat, and Bellows thermo stat. **(04 Marks)**

2 a. What is Carburetor? With a neat sketch explain construction and working of constant draft carburetor. **(12 Marks)**

b. With sketch explain the working of s.u. electrical pump. **(08 Marks)**

3 a. With sketches explain any two methods of supercharging arrangement. **(08 Marks)**

b. With sketch explain : i) Pulse turbo charging ii) Hyper bar turbo charging. **(08 Marks)**

c. Give any four comparisons between Turbo charging and mechanical super charging. **(04 Marks)**

4 a. With appropriate circuit diagram explain 4 cylinder battery ignition systems. **(10 Marks)**

b. With a neat sketch explain the construction & working and vacuum advance mechanism. **(06 Marks)**

c. Write atleast eight differences between magneto ignition and Battery ignition. **(04 Marks)**

PART – B

5 a. With a neat sketch explain the fluid flywheel. Used is Automobiles. **(08 Marks)**

b. Explain the freewheeling mechanism with sketch. **(04 Marks)**

c. Bring out at least four differences between dog clutch and synchroniser unit. **(02 Marks)**

d. Determine the dimensions of a clutch plate developing 40kW at 4000rpm. The inner diameter of the clutch plate is 0.6 times its outer diameter and it is to be ensured that even after a loss of 30% of the engine torque due to clutch facing wear, it should not slop. The pressure intensity should not exceed 75KPa take $\mu = 0.3$. **(06 Marks)**

6 a. With neat sketch, describe differential unit employed in automobiles. **(08 Marks)**

b. Draw the sketches to show i) Castor ii) Camber iii) Toe – in iv) Toe – out. **(08 Marks)**

c. A motor vehicle has a wheel base of 2.75m and pivot centers are at a distance of 1.05m apart the front and rear wheel track is 1.25m. Determine the correct angle of outside lock and turning circle radius of outer front wheel, when the angle of inside of lock 40°. **(04 Marks)**

7 a. Explain the torsion bar suspension system. **(04 Marks)**

b. Describe the construction and operation of disc brake. **(08 Marks)**

c. Draw the layout of hydraulic braking system and explain its operation clearly. **(08 Marks)**

8 a. With schematic diagram explain vapour recovery system clearly. **(05 Marks)**

b. Explain with sketches Air injection and Air aspirator system. **(12 Marks)**

c. Give a brief account of emission standards opted in India. **(03 Marks)**

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Eighth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Automotive Engineering

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Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. List out the spark ignition and compression ignition engines components and mention its functions. **(10 Marks)**

b. What is air swirl? What are the methods of swirl generation in compression ignition engine? **(06 Marks)**

c. Explain the splash lubrication, with a neat sketch. **(04 Marks)**

2 a. What is octane and Cetane ratings for petrol and diesel fuel? **(04 Marks)**

b. Explain the construction and working principle of zenith carburetor with neat sketch. **(10 Marks)**

c. Explain the working principle of electrical fuel pump with neat sketch. **(06 Marks)**

3 a. What do you understand by the term supercharging and turbocharging? **(04 Marks)**

b. Explain the centrifugal type and Root's supercharger with neat sketch. **(10 Marks)**

c. Explain any three methods of turbocharging. **(06 Marks)**

4 a. List out the different types of ignition system. Explain the construction and working principle of electronic ignition system. **(10 Marks)**

b. Draw neat circuit diagram of battery ignition system and explain the functions of various components in the system. **(10 Marks)**

PART – B

5 a. Explain the construction and working principle of multi plate clutch. **(10 Marks)**

b. Explain with diagram the working of constant mesh gear box and mention its advantages over sliding mesh gear box. **(10 Marks)**

6 a. What is the function of differential? Explain its operating principle with neat diagram. **(10 Marks)**

b. Define the following terms : i) camber ii) castor iii) king pin inclination iv) toe in and toe out v) included angle. **(10 Marks)**

7 a. Explain the working principle of the telescopic type shock absorber with a neat sketch. **(09 Marks)**

b. Explain the working of hydraulic braking system with neat diagram. **(08 Marks)**

c. Draw the layout of air brake system. **(03 Marks)**

8 a. Explain the working principle of exhaust gas recirculation (EGR) system with neat diagram. List out the methods of controlling the engine emission. **(10 Marks)**

b. What is catalytic converter? How they are helpful in reducing exhaust gas emission? Explain with neat sketch the 3–way catalytic converter system. **(10 Marks)**

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Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Draw the valve time diagram for a 4 – stroke Spark Ignition (SI) engine and explain. **(06 Marks)**

b. Why cooling is necessary for I.C engines? Explain thermo siphon cooling with neat sketch. **(07 Marks)**

c. What is Swirl? Explain the different methods of Swirl generation. **(07 Marks)**

2 a. With neat sketch, explain the normal and abnormal combustion in SI engines. **(06 Marks)**

b. What are the main functions of carburetor? With neat sketch, explain Zenith carburetor. **(07 Marks)**

c. What do you mean by Cetane and Octane numbers? **(04 Marks)**

d. Explain briefly the alternate fuels for IC engines. **(03 Marks)**

3 a. Distinguish between Supercharging and Turbocharging. **(06 Marks)**

b. With neat sketch, explain any one type of supercharger. **(07 Marks)**

c. With neat sketch, explain the construction and operation of Turbocharger. **(07 Marks)**

4 a. Name the different types of Ignition systems. With neat sketch, explain Battery Ignition system. **(08 Marks)**

b. With neat circuit diagram, explain the principles of Electronic Ignition system. **(07 Marks)**

c. What do you mean by Ignition advance? List and explain any two factors affecting ignition advance. **(05 Marks)**

PART – B

5 a. Explain the working principle of Automatic transmission. **(06 Marks)**

b. With the neat sketch, explain the working of constant mesh gear box. **(06 Marks)**

c. With neat sketch, explain the working principle of Single plate and Multi plate clutches. **(08 Marks)**

6 a. Write a short note on Propeller shaft. **(04 Marks)**

b. With neat sketches, explain the Hotchkiss and Torque tube drives. **(10 Marks)**

c. Explain briefly the working of Power steering. **(06 Marks)**

7 a. What are the requirements of suspension system? With neat sketch, explain the working of leaf spring. **(07 Marks)**

b. Differentiate between disc brakes and drum brakes. **(06 Marks)**

c. Explain the purpose and operation of Antilock braking system. **(07 Marks)**

8 a. With the relevant sketch, explain the working of Exhaust Gas Recirculation [EGR]. **(07 Marks)**

b. Write short notes on Euro – II and Euro – III norms. **(05 Marks)**

c. Write short notes on :
i) Catalytic converter ii) Controlling crank case emissions. **(08 Marks)**

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10ME844

Eighth Semester B.E. Degree Examination, June / July 2014
Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART - A

1 a. Compute wet and dry liners in automotive engines. **(04 Marks)**
b. What are the functions of piston rings and explain with diagram the operation of piston rings? **(08 Marks)**
c. Sketch any two type piston design to keep heat away from lower part of piston. **(08 Marks)**

2 a. What is Octane and Cetane ratings for gasoline and diesel fuel? **(04 Marks)**
b. Explain with sketch working of cartels carburetor. **(08 Marks)**
c. Explain with diagram working of A.C mechanical fuel pump **(08 Marks)**

3 a. Distinguish between supercharging and turbocharging. **(04 Marks)**
b. What is turbo charger lag and explain how it can be controlled? **(06 Marks)**
c. Explain different methods of supercharging. **(10 Marks)**

4 a. Draw neat circuit diagram of battery ignition system and explain functions of various devices in circuit. **(10 Marks)**
b. With neat circuit diagram, explain the principles of electronic ignition system. **(06 Marks)**
c. What is ignition advance and list the factors affecting ignition advance? **(04 Marks)**

PART - B

5 a. Mention any four requirements of clutch for transmission of torque. **(03 Marks)**
b. Explain with neat diagram working of single plate clutch. **(07 Marks)**
c. Explain with diagram working of constant mesh gear box and mention its advantages over sliding mesh gear box. **(10 Marks)**

6 a. What is the function of differential and explain its operation with neat diagram. **(10 Marks)**
b. What is camber and mention the effects of positive camber? **(06 Marks)**
c. Mention the advantages of power steering. **(04 Marks)**

7 a. Explain with schematic diagram the air suspension system. Mention its advantages and disadvantages. **(10 Marks)**
b. Explain with diagram, the working of hydraulic braking system. **(08 Marks)**
c. What is Anti – lock Bracking system (ABS)? **(02 Marks)**

8 a. Briefly explain crankcase emissions controlling. **(04 Marks)**
b. Explain with diagram the Exhaust Gas Circulation System (EGR). **(08 Marks)**
c. What is catalytic converter? How they are helpful in reducing exhaust gas emission? Explain the 3 – way catalytic converter system. **(08 Marks)**

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10ME844

Eighth Semester B.E. Degree Examination, June/July 2015
Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the various methods of cylinder arrangements in multicylinder engines. **(08 Marks)**

b. What do you mean by Swirl generation in CI engines? What are the different methods of Swirl generation? **(06 Marks)**

c. What are the various methods of engine cooling? Explain with sketch the thermosyphon system of cooling. **(06 Marks)**

2 a. Explain with a neat sketch normal and abnormal combustion in SI engines. **(06 Marks)**

b. Sketch and explain Zenith carburetor. **(10 Marks)**

c. What are the octane and cetane numbers? **(04 Marks)**

3 a. What are the objectives of super charging and explain any two arrangements of supercharging. **(10 Marks)**

b. What is the need of turbocharging? Explain any one method of turbo charging giving its merits and demerits. **(10 Marks)**

4 a. What are the requirements of ignition system? Sketch and explain battery ignition system. **(10 Marks)**

b. What do you mean by ignition advance? Explain the following ignition advance methods:
i) Centrifugal advance, ii) Vacuum advance. **(10 Marks)**

PART – B

5 a. Classify clutches (detailed classification). With neat sketch, explain working principle of friction clutches. **(06 Marks)**

b. Explain necessity for gear ratios in transmission. **(06 Marks)**

c. Explain working principle of automatic transmission. **(08 Marks)**

6 a. With a neat sketch, explain the torque tube drive. What are its merits over Hotch-Kiss drive? **(08 Marks)**

b. Define the following and explain their effect on steering:
i) Camber ii) King pin inclination
iii) Castor iv) Toe in and Toe out **(12 Marks)**

7 a. What are the requirements of a suspension system? Explain air suspenstion system with sketch. **(08 Marks)**

b. Explain with a neat sketch working of master cylinder. **(08 Marks)**

c. Differentiate between disc brakes and drum brakes. **(04 Marks)**

8 a. Explain the controlling of crank case emissions, with sketch. **(08 Marks)**

b. What are the methods used to reduce amount of pollutants in the exhaust gas? With neat sketch, explain exuast gas recirculation system. **(08 Marks)**

c. What are catalytic converters? How they are helpful in reducing HC, CO and NO_x emissions. **(04 Marks)**

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10ME844

Eighth Semester B.E. Degree Examination, June/July 2016
Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. List advantages of Aluminium alloy pistons. **(04 Marks)**
b. With neat sketches, explain the construction and purpose of dry and wet liners. **(08 Marks)**
c. Draw the valve timing diagram for a 4 stroke petrol engine indicating clearly the position of following and also briefly explain them. i) IVO ii) IVC iii) Ignition iv) EVO v) EVC. **(08 Marks)**

2 a. What are octane and cetane ratings for gasoline and diesel fuel? **(04 Marks)**
b. Explain with sketch working of carter carburetor. **(08 Marks)**
c. With a neat sketch explain the working of fuel injector. **(08 Marks)**

3 a. What are the objectives of super charging? **(04 Marks)**
b. With neat sketch explain the working of i) Vane blower ii) Roots blower. **(08 Marks)**
c. What is turbo charger lag and explain how it can be controlled? **(06 Marks)**
d. What is super charging? **(02 Marks)**

4 a. With a schematic diagram explain the working of transistor ignition system. **(08 Marks)**
b. With sketch explain the working of vacuum advance. **(08 Marks)**
c. What is ignition advance and list the factors affecting ignition advance? **(04 Marks)**

PART – B

5 a. Explain with neat diagram working of single plate clutch. **(06 Marks)**
b. How different speeds are obtained by using planetary gear systems. **(07 Marks)**
c. With a neat sketch, explain the working principle of fluid coupling. **(07 Marks)**

6 a. What is function of differential and explain its operation with neat diagram. **(10 Marks)**
b. Explain the working of power steering. Mention the advantages of power steering. **(10 Marks)**

7 a. With neat sketch, explain the working of telescopic type shock absorber. **(10 Marks)**
b. Draw the layout of a pneumatic breake system. **(08 Marks)**
c. What is Anti-lock Bracking system (ABS)? **(02 Marks)**

8 a. Explain various evaporative emission control system. **(08 Marks)**
b. Explain i) Air injection system ii) Air aspirator valve. **(12 Marks)**

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Automotive Engineering

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain wet and dry liners with the help of diagrams. **(06 Marks)**
b. With a neat sketch, explain pump circulation system of water cooling. **(07 Marks)**
c. Explain single row overhead valve mechanism with a neat sketch. **(07 Marks)**

2 a. Describe fuel mixture requirements of S.I.Engine. **(06 Marks)**
b. Draw a typical diesel engine fuel injector and explain its working. **(08 Marks)**
c. Define the terms cetane number and octane number. How they are related to knocking phenomenon in IC engines? **(06 Marks)**

3 a. Define super charging. Also explain centrifugal type superchanger. **(08 Marks)**
b. Enumerate the advantages of turbochanging in diesel engines. **(06 Marks)**
c. Write a brief note on intercooler. **(06 Marks)**

4 a. With a neat diagram, explain the battery ignition system. **(07 Marks)**
b. Draw and explain a typical electronic ignition system. **(07 Marks)**
c. Explain vaccum advance mechanism with a neat figure. **(06 Marks)**

PART – B

5 a. Explain torque converter with a neat sketch. **(06 Marks)**
b. With a neat diagram, explain synchromesh three speed gear box. **(07 Marks)**
c. The engine of a car employing a single plate friction clutch develops maximum torque of 150 Nm. External diameter of the clutch plate is 1.2 times its internal diameter. Determine the dimensions of the clutch plate and the axial force provided by the sprirgs. The maximum allowable pressure intensity for the clutch facings is 100 KPa. Coefficient of friction = 0.3. Assume uniform wear. **(07 Marks)**

6 a. With a neat sketch, explain the working of Hotchkiss drive. **(06 Marks)**
b. Describe worm and wheel steering gear with a neat sketch. **(06 Marks)**
c. The wheel base of a car is 2.7 m and pivot centres are at 1 metre. The wheel track is 1.2 m. Calculate the correct angle of outside lock and turning circle radius of the outer front and inner rear wheels when the angle of inside lock is 40°. **(08 Marks)**

7 a. With a neat sketch, explain the working of torsion bar. **(06 Marks)**
b. Explain wheel cylinder of hydraulic braking system with a neat sketch. **(08 Marks)**
c. Draw and explain the layout of air braking system. **(06 Marks)**

8 a. Explain Exhaust Gas Recirculation (EGR) with a neat diagram. **(08 Marks)**
b. With a neat sketch, explain the catalytic converter. **(06 Marks)**
c. How the air injection system helps in reducing overall emission effect? **(06 Marks)**

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