APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: AU203
Course Name: AUTO CHASSIS

Max. Marks: 100
Duration: 3 Hours

PART A
Answer any three full questions, each carries 10 marks.

1 a) What are the different types of wheels used in an automobile and list down the advantages and disadvantages of each wheel? (10)
   b) Explain X-frames. (5)

2 a) Explain the different cross-sections used in frames. (5)
   b) Explain the different loads acting on the axles. (5)

3 a) What are the functions of radius rods and panhard rods in the stability of the vehicle? (5)
   b) Explain with a neat diagram, Hotchkiss and torque tube drive. (10)

PART B
Answer any three full questions, each carries 10 marks.

5 a) Before differential, how was the automobiles designed and how was the drive provided? (5)
   b) For the same vehicle, if we change the rear axle from fully floating to semi floating, will the axle size increase, decrease or remain the same. Provide the reason behind your answer. (5)

6 a) List Down the driving forces acting on the driving axle. (5)
   b) Which are the types of axle housings? Explain with neat diagram (5)

7 a) Why do we require a suspension system in a vehicle? (5)
   b) What are the functions of a suspension system? (5)

8 a) With a neat diagram, explain the working of a telescopic dampers. (10)

PART C
Answer any four full questions, each carries 10 marks.

9 a) List down the energy conversion happening during braking. Explain how the force is multiplied in the hydraulic braking system. (5)
   b) Why is the vehicle fitted with disc brake in the front and drum brake in the rear and not vice versa? (5)

10 a) Explain the pneumatic braking system with a neat block diagram. (10)

11 a) What are the classifications of disc brake? Explain each of them. (10)

12 Explain the following:
a) Reversible and irreversible steering (3)
b) Steering error curve (3)
c) Oversteer and understeer (4)

13 a) Explain the different stub axle types and list the most popularly used one (10)

14 a) Explain the working of a recirculating ball type steering gearbox with a neat sketch (10)
PART A

Answer any three full questions, each carries 10 marks.

1. a) With the aid of a neat diagram explain semi forward and fully forward chassis layouts. (8)
   b) What are the loads acting on vehicle frames? (2)

2. a) With the help of a neat sketch explain the constructional details of perimeter frame. (5)
   b) What are the major defects in frames, also explain the commonly used method to test a vehicle frame? (5)

3. a) What is meant by driving thrust and torque reaction illustrate with relevant diagrams? (5)
   b) Explain different types of disc wheels used in automobiles. (5)

4. a) Draw and explain the working of front engine front wheel drive transmission system. (5)
   b) Mention the different multi axle drives in common; also with a neat sketch explain twin axle system. (5)

PART B

Answer any three full questions, each carries 10 marks.

5. a) With the aid of a detailed diagram explain the construction and working principle of differential under different road conditions? (8)
   b) What are the different loads experienced on the rear axle of an automobile? (2)

6. a) Mention the various types of drive axles and their working with supportive diagrams. (8)
   b) List out the different types of limited slip differentials used. (2)

7. a) With neat figures explain the rubber springs used in vehicle’s suspension system. (8)
   b) What is the importance of suspension system in a vehicle transport system? (2)

8. a) How the stabilizer or anti roll bar prevents rolling of vehicle? (5)
b) Draw and explain the working principle of wishbone type independent suspension system? (5)

PART C

Answer any four full questions, each carries 10 marks.

9  a) With the help of a neat sketch explain the working of disc brake system? (5)
   b) How bleeding is performed in hydraulic brakes illustrate with supporting figures? (5)

10 a) With a neat schematic diagram mention the construction and working of vacuum servo brake system? (8)
   b) What are the factors influencing braking efficiency? (2)

11 a) With the aid of a neat sketch illustrate the working of Tandem master cylinder? (6)
   b) Explain the construction and working of drum brakes with simple sketch? (4)

12 a) What are the important steering geometries used illustrated with supportive line diagrams? (10)

13 a) Explain the Ackermann and Davis steering gear mechanism with neat sketch? (8)
   b) What are the different types of stub axles in use? (2)

14 a) With the help of a neat diagram explain the construction and working of worm and wheel steering gear box? (5)
   b) Elucidate with proper sketches about the construction and working of worm and nut type steering gear? (5)
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY  
THIRD SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018  
Course Code: AU203  
Course Name: AUTO CHASSIS  

Max. Marks: 100  
Duration: 3 Hours  

PART A  
Answer any three full questions, each carries 10 marks  

1 a) With the help of neat sketch explain constructional details of a conventional frame. (6)  
b) What are the various defects in frames and their remedies? (4)  
2 a) How are disc wheels classified? (4)  
b) Explain classification of tyres based on carcass. (6)  
3 a) Compare Hotchkiss and Torque tube drive. (3)  
b) What are the different types of universal joints? (3)  
c) Explain the Hypoid type final drive with its advantage. (4)  
4 a) With the help of neat sketch explain different types of double reduction arrangements. (6)  
b) Explain the constructional details of a twin speed final drive. (4)  

PART B  
Answer any three full questions, each carries 10 marks  

5 a) What are the constructional features and advantages of fully floating type rear axle? (6)  
b) What are the various loads acting on drive axles? (4)  
6 a) Explain with a neat sketch the construction and working of differential lock mechanism. (6)  
b) What are the different types of differential housings used? (4)  
7 a) Mention some of the advantages of rubber suspension. (4)  
b) Explain the construction of torsion bar suspension with a neat sketch. (6)  
8 With the help of neat sketch explain the construction and working of hydra gas suspension. (10)  

PART C  
Answer any four full questions, each carries 10 marks  

9 a) What are leading and trailing shoes in drum brake system? (4)  
b) Explain the construction of floating caliper type disc brakes with neat sketches. (6)  
10 What is servo mechanism? Explain the working of vacuum servo mechanism. (10)  
11 With the help of neat sketch explain the ABS mechanism. What are its advantages. (10)  
12 What are the different types of stub axles used? Explain each of them with neat (10)
sketches.

13 Explain the following terms:
   i) Wheel rake    ii) Negative Castor    iii) SAI
   iv) Toe out      v) Included angle

14 a) Compare Ackermann and Davis steering mechanism.
   (4)
   b) Explain the working of Recirculating ball type steering gear box with neat sketch.
   (6)

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PART A

Answer any three full questions, each carries 10 marks.

1. a) Draw the simple sketch of a chassis layout and state the functions of each member. (6)
   b) What are the different types of Rims used in automobiles? Explain with neat figures. (4)

2. a) Explain the types of chassis layout with reference to the location of power plant, with merits and demerits of each of them. (6)
   b) Describe about stabilizer and radius rods used in automobiles. (4)

3. With neat figure explain any two types of constant velocity universal joint. (10)

4. a) Explain the construction and working of twin speed final drive with neat sketches. (7)
   b) What are the functions of propeller shaft and universal joints? (3)

PART B

Answer any three full questions, each carries 10 marks.

5. Explain the construction and working of telescopic shock absorber with neat figures. (10)

6. Explain any two type of independent suspension system used in front wheels with neat figures. (10)

7. a) What are the different types of springs used in suspension systems? (6)
   b) Compare between the different axle hub arrangements in rear axle. (4)

8. Explain the construction and working of a Non slip differential with neat figures. (10)

PART C

Answer any four full questions, each carries 10 marks.

9. a) What are the advantages of hydraulic brake system over mechanical brake system? (3)
   b) What are ABS (Antilock Braking System) and EBD (Electronic Brake force Distribution)? When would they useful? How do they work? What are their advantages and limitations? (7)

10. What are the different types of Disc brakes used in vehicles? Explain two types of disc brakes with construction and working, based on disc brake pad support arrangements. (10)

11. a) Derive the expression for braking efficiency if initial braking speed and braking distance are known. (8)
    b) Determine the braking efficiency of vehicle if the brakes bring the vehicle from 60 kmph in a distance of 15 meters. (2)

12. What are the significance of front wheel geometry? Explain all of them in detail with sketches. (10)

13. a) Describe how the true rolling is achieved through Ackerman’s steering principle. (5)
    b) With neat sketch explain the Ackerman’s linkage geometry. (5)

14. What are the different types of steering gears used in automobiles? Explain rack and pinion steering gear box and recirculating ball type steering gear box with neat figures. (10)

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PART A
Answer any 3 questions.

1. In an ideal Otto cycle, the compression ratio is 8. The initial pressure and temperature of the air are 1 bar and 100°C. The maximum pressure in the cycle is 50 bar. For 1 kg of air flow, calculate the values of the pressure, volume and temperature at the four salient points of the cycle. What is the ratio of heat supplied to heat rejected? (10)

2. Discuss in detail the different losses accounted in actual cycle analysis. (10)

3. Discuss the effect of various engine variables on the phenomenon of detonation. (10)

4. (a) Define the following terms - Octane number, LCV, HCV, HUCR. (4)

   (b) In a bomb calorimeter test of gasoline, the calorific value measured was found to be 46.9 MJ/kg. If the fuel contains 14.4 % H₂ by mass, calculate the LCV of the gasoline sample tested.

   Given: the enthalpy of vaporisation of water at 25°C as 2.3 MJ/kg. (6)

PART B
Answer any 3 questions.

5. Carry out the exact analysis to calculate the air-fuel ratio for a simple carburettor. (10)

6. Explain briefly the different systems in MPFI system with neat sketch. (10)

7. Explain the different components of a basic ignition system considering the battery ignition system with neat sketches. (10)

8. Explain briefly the theoretical scavenging processes with neat figures. (10)

PART C
Answer any 4 questions.

9. Explain the different drives used for operating the valve mechanism with neat figures. (10)
10. What is meant by valve timing? What is the significance of valve timing? Explain it briefly with the help of actual valve timing diagram and compare it with theoretical valve timing diagram. (10)

11. Explain in detail the different types of mufflers used in SI engines. (10)

12. (a) Differentiate between forced and thermo-siphon cooling system (5)
   (b) What are the disadvantages of overcooling? (5)

13. (a) What are the desirable properties of engine lubricating oil? (5)
   (b) Explain the basic principle of lubrication. How will you determine the viscosity index of lubricating oil? (5)

14. Explain the different types of oil pumps used in lubrication system. (10)
Reg No.:_________________ Name:____________________________

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code: AU 203
Course Name: AUTO CHASSIS (AU)

Max. Marks:100 Duration: 3 Hours

PART A
Answer any three questions. Each carries 10 marks
1. With neat figures, explain the different types of vehicle construction methods with respect to the frame of the vehicle.
2. Explain the ride characteristics of radial & bias ply tyres with figures and graphs.
3. Explain Hotchkiss drive and torque tube drive with respect to the components that absorb and transfer torque reaction and driving thrust respectively.
4. What are different CV joints available for vehicles? Explain the working of Rzeppa joint and Tripod joint with neat figures.

PART B
Answer any three questions. Each question carries 10 marks
5. According to loads acting, explain the different types of axles used in automobiles with neat figure.
6. Explain the construction & working of differential (in straight & curve movement) with neat figures.
7. Explain the classification of leaf springs. What you meant by tapered leaf springs and helper springs.
8. Explain the construction and working of air suspension system with neat figure.

PART C
Answer any four questions. Each carries 10 marks
9. Explain the working of hydraulic brake system with sketch. Also explain the construction and working of mono piston master cylinder.
10. What the different types of power assisted brakes? Explain the working of vacuum booster in hydraulic brake system.
11. What you meant by ABS? Explain its working and importance.
12. What are the different types of stub axles used with front dead axles? Explain with neat figures.
13. Explain the true rolling condition, turning radius & Ackermann steering mechanism.
14. Explain the conventional steering linkages with recirculating ball type gearbox.