Scheme –I

Sample Question Paper

Program Name : Diploma in Automobile Engineering
Program Code : AE
Semester : Fifth
Course Title : Automobile Component Design
Marks : 70 **Time: 3 Hrs.**

22558

Instructions:
(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) Attempt any FIVE of the following. **10 Marks**

a) Describe failure by fracture with suitable example.
b) Describe load factor and service factor.
c) State and justify material for clutch lining.
d) Describe the functions of piston crown and piston skirt.
e) Calculate stroke length and bore length if piston diameter is100 mm.
f) Describe ergonomics.
g) Sketch a method to reduce stress concentration in cylindrical members with holes.

Q.2) Attempt any THREE of the following. **12 Marks**

a) List basic design requirements of piston.
b) The crankpin sustains a load of 35 KN, if allowable bearing pressure is 7 N/mm^2. Length of pin is 1.2 times diameter of pin.
c) A semi elliptical leaf spring sustains a load of 70 KN. The overall length of the spring is 1m, consists of 18 leaves hold together by U bolts spaced 100mm apart with overall depth to width ratio of 2.The allowable stress for spring material is 400 MPa. Take E = 210 KN/mm^2.
d) State any two uses of each of the following,
stress – strain diagram and S-N curve.

Q.3) Attempt any THREE of the following. **12 Marks**

a) Describe design procedure for fully floating rear axle.
b) Describe design procedure for I Section of front axle.
c) Describe design procedure for piston pin.

d) List reasons to adapt standardization in component design.

e) Describe any two failure theories with their application.

Q.4) Attempt any TWO of the following. 12 Marks

a) Front axle carries a load of 100KN. Wheel track is 1.4m. Distance between Wheel centre and spring centre is 100mm. If stress is not to exceed 100 MPa Find its diameter.

b) Calculate maximum, minimum and average pressure in a plate clutch ,if axial load is 4KN.The inside and outside radii of friction lining are 50 and 100 mm respectively.

c) List sequentially steps to design rocker arm.

Q.5) Attempt any TWO of the following. 12 Marks

a) State functions and Name suitable materials of the following, Piston crown, piston rings, piston pin.

b) Compare front axle and rear axle on the basis of force to be supported, stresses induced, cross section used.

c) Explain basic automobile component design procedure.

Q.6) Attempt any TWO of the following. 12 Marks

a) Find the minimum size of hole that can be punched in a 20 mm thick plate having ultimate shear strength of 300MPa and the maximum allowable compressive strength of punch material is 1200MPa.

b) Explain in detail the design procedure for tie rod.

c) Describe the design procedure for propeller shaft.

Scheme –I

Question Test Paper - I

Program Name : **Diploma in Automobile Engineering**

Program Code : **AE**

22558

Semester : **Fifth**

Course Title : **Automobile Component Design**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. Define bearing pressure and crushing stress.
b. Describe elastic failure.
c. State any two aesthetic considerations.
d. State causes of stress concentration.
e. Define working stress, factor of safety.

Q.2 Attempt any TWO **12 Marks**

a. List Ergonomic considerations for designing Automobile components
b. Explain the phases of Design process of Automobile components.
c. Describe design procedure for multi plate clutch.

Scheme –I

Question Test Paper - II

Program Name : **Diploma in Automobile Engineering**

Program Code : **AE**

22558

Semester : **Fifth**

Course Title : **Automobile Component Design**

Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a. State function of leaf spring and state suitable material for it.

b. Define indicated power and state its mathematical expression.

c. State stresses induced in piston pin.

d. State Rankin formula for connecting rod cross –section design.

e. Draw proportionate sketch of fully floating rear axle.

Q.2 Attempt any TWO. **12 Marks**

a. Draw a neat sketch of universal coupling used in propeller shaft.

b. Describe design procedure of push rod**.**

c. Describe design procedure of valve spring.