Printed Pages : 2 **Roll No.** | | | | | | | | | | | **NAU603**

B. TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

DESIGN OF AUTOMOTIVE COMPONENTS

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Attempt all of the following questions: 10 x 2 = 20

(a) What do you mean by camber and castor in steering system?

(b) What is meant by double declutching?

(c) What is the necessity of gearbox?

(d) What do you mean by tractive effort?

(e) What is the need of clutch in the automobile?

(f) What is sprag clutch?

(g) Why do we have cushioning springs in the clutch friction plate?

(h) What is the material for clutch facing?

(i) What is the use of propeller shaft in an automobile?

(j) What is final drive?

SECTION – B

2. Attempt any five of the following questions: 5 x 10 = 50

(a) Draw neat diagram of a synchromesh gearbox and explain its working.

(b) A multi plate clutch of alternate bronze and steel plates is to transmit 6KW power at 800 rpm. The inner radius is 38 mm and outer radius is 70mm. The coefficient of friction is 0.1 and maximum allowable pressure is 350 KN/m2. Determine the followings:-

(i) Axial force required.

(ii) Total no. of discs.

(iii) Actual Maximum pressure.

(c) Derive an expression for effective mean radius and torque transmitted in case of Multi plate clutch assuming different condition.

(d) Explain the computer aided design of leaf spring with the help of diagram.

(e) Write the steering behavior for vehicle. Explain in brief.

(f) Derive the derivation of Ackerman steering gear.

(g) Describe the total resistance faced when a vehicle is travelling on the road.

(h) Explain the different types of load and stresses which are acted on the front axle.

SECTION – C

Attempt any two of the following questions: 2 x 15 = 30

3. Write the fundamental equations for correct steering. Derive the expression for it with neat sketch. A motor car has wheel base of 2.743 m and pivot centers 1.056 m apart. The front and rear wheel track is 1.217 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˚.

4. A sliding mesh type of gear box giving 3 forward and one reverse gear ratios provides the speed reductions as follows: third 5:1, second 8:1 , first 15:1, reverse 18:1.The permanent

speed reduction is 5:1 at the rear axle. Assume that the speed of the lay shaft is half that of the clutch shaft and the clutch pinion is to have at least 15 teeth .Calculate the number of teeth of various gears.

5. What is a Final drive? Explain with suitable sketch. Derive an expression for full floating rear axle with diagram.