gear if this power is available at 2200 rpm. And the effective radius of the wheel is 42 cm. Also calculate the maximum speed of this vehicle in top gear on level road at the same engine speed assuming the transmission efficiency of 90% in top gear. What is the gear ratio in top gear? The differential has a reduction of 4.

(5+ 10)

9. Write short notes on any three of the following:

3x5=15

a) Torque Converter

b) Necessity of Gear Box with neat sketch

c) Parallel hybrid vehicle drive

d) Multi-plate Clutch

e) Constant mesh gear box

10. What is fly wheel? What are the importance of fly wheel in automobile transmission? A single dry plate clutch, effective on both sides is required to transmit 25 kW at 3000 r.p.m. Determine the outer and inner radius of frictional surface if the coefficient of friction is 0.255, the ratio of radius is 1.25 and the pressure is not to exceed 0.1 N/mm^2.

Also determined the axial thrust to be provided by springs. Assume the theory of uniform wear.

3+3+9

11. a) Draw a neat sketch of a centrifugal clutch and explain its construction and operation.

b) A multi-plate clutch has three discs on the driving shaft and two on the driven shaft. The outer diameter of the contact surfaces is 240 mm and the inside diameter 120 mm. Assuming uniform wear and co-efficient of friction is 0.25. Calculate the maximum axial intensity of pressure between the discs for transmitting 24 kW at 1575 rpm.

(7+8)

CS/B.Tech/Even/AUE/6th Sem/AUE-602/2014

2014

Power Unit & Transmission

Time Alloted : 3 Hours *Full Marks : 70*

The figure in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following:

10x1=10

i) The inertia of the rotating parts of the clutch should be

a. Minimum b. maximum c. zero d. none of these

ii) Clutch chattering or grabbing is noticeable

a. At low speed b. When engaging the clutch
c. During idle d. None of the above

iii) The part of a torque converter that facilitates change of torque between input and output shaft is the: .

a) Turbine b) Pump c) Stator d) None of the above

iv) Two advantages of using helical gears rather than spur gears in a transmission are

a) High strength and low cost
b. High strength and less end thrust
c) Low noise level and high strength
d. Low noise level and economy

v) The maximum torque multiplication ratio in torque converter is about

a. 2.5 b. 5.0 c. 10 d. 25

vi) A sliding mesh gearbox has a gear ratio 4: 1 at the third gear position. The clutch shaft gear has 15 teeth and its mating lay shaft gear is having 45 teeth. If the main shaft gear contains 28 teeth, the mating lay shaft gear should have:

a) 19 teeth b) 21 teeth c) 20 teeth d) 18 teeth

vii) Direct drive in a gear box is generally obtained by connecting

a. together two gear of equal size
b. the smallest main shaft gear to the main shaft
c. the smallest lay shaft pinion with largest main shaft wheel
d. the primary shaft to the main shaft by a dog clutch.

viii) Air resistance to a car at 20 km/hr is R. The air resistance at 40 km/hr would be

a. R b. 2R c. R^2 d) R/2

ix) If number of teeth in ring gear is 140 and sun gear is 60. Then what will be the overdrive gear ratio?

a) 0.4:1 b) 1.42:1 c)0.7:1 d) 2.33:1

x) In hydrostatic transmission system

a) Inlet velocity of fluid is more than outlet velocity
b) Inlet velocity of fluid is same as that of outlet velocity
c) Inlet velocity of fluid is less than outlet velocity
d) No relation

GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. 3x5=15

2. Write short notes on multiple disk clutch with brake band and brake drum

3. Explain the principle of modified ward Leonard type control for electric drive in vehicles.

4. Explain with neat sketch of a Synchromesh gear box

5. A two speed epicyclic gear box has two gear trains, each of which consists of sun gear having 20 teeth and annulus having 80 teeth. Calculate two gear ratio.

6. a) Draw the power flow through torque converter to the planetary gear in automatic gear box.

b) How the efficiency of a torque converter varies with speed ratio?

(2+3)

GROUP - C

(Long Answer Type Questions)

Answer any *three* of the following. 3x15=45

7. a. Explain front engine front wheel drive layout. Compare it with front engine rear wheel drive layout.

b. A car weighing 2000 kg has a static weight distribution on the axles of.50:50. The wheel base is 2.8 m and height of centre of gravity above ground is 0.5 m. The coefficient of friction on The highway is 0.7. Calculate the advantage of having rear wheel drive rather than front wheel drive as far as gradeability is concerned, If engine power is not the limitation.

(4+3+8)

8. a) Why is a gear box necessary?

b) An engine is required to power a truck having a gross weight of 4200 kg. The maximum grade which the truck will have to negotiate at 35 km/hr in second gear is expected to be 16%. The rolling resistance coefficient is 0.016 and the air resistance coefficient is 0.033 in the formula as follows:

The total resistance = $KrW + KaV^2A$,

Where A is in m^2 and V in km/hr.

The frontal area is 5 m^2. The transmission efficiency in second gear is 80%. Calculate the minimum power which should be available from the engine and gear ratio in second