TED (15) – 5051

(REVISION — 2015)

Reg. No.....

Signature .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2019

AUTOMOBILE DESIGN

[*Time* : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

Marks

I Answer *all* questions in one or two sentences. Each question carries 2 marks.

1. Name any 2 types of designs.
2. List any two types of keys.
3. State the function of torsion springs in clutch disc.
4. Define the term Module in a spur gear.
5. Recall the phenomena 'Creep' in belt drives. (5×2 = 10)

PART — B

(Maximum marks : 30)

II Answer any *five* of the following questions. Each question carries 6 marks.

1. List the factors governing design of machine elements.
2. Write short note on the materials used for making belt.
3. Discuss the various loads acting on connecting rod.
4. Summarize the types of gear trains used for power transmission.
5. List the advantages and disadvantages of antifriction bearings.
6. Summarize the requirements of shaft coupling.
7. Describe 6 Cam terminologies with a sketch of cam and follower. (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

III (a) Discuss the General procedure in design. 8

(b) Explain any one inversion of double slider crank chain with sketch. 7

OR

Marks

IV (a) Define Kinematic pair and classify them. 8

(b) A solid shaft transmitting 560 kW power at 300 rpm. The maximum shear stress of the material is 60 N/mm². Find the diameter of the shaft. 7

UNIT — II

V (a) Explain the reason for the slack side of the belt of a horizontal belt drive is preferable to place on the top side. 8

(b) A chain drive uses 1.25 cm pitch chain. The sprockets have 14 and 48 teeth and the centre distance is 70 cm. Find the length of chain. 7

OR

VI (a) List the 6 advantages and 2 disadvantages of chain drive over belt drive. 8

(b) Two pulleys 60 cm and 40cm diameters are connected by a belt. Centre distance between the pulley is 6 meter. Find the length of belt for (i) open belt drive, (ii) crossed belt drive. 7

UNIT — III

VII (a) A multiple - disc clutch transmits 50 kw of power at 1400 rpm. Axial intensity of pressure not to exceed 0.121 N/mm², and the coefficient of friction of the friction surfaces is 0.12 the inner radius of the discs is 80 mm, and is 0.7 times the outer radius. Determine number of disc required to transmit the given power. Assume uniform wear condition. 8

(b) List the types of clutches used for power transmission. 7

OR

VIII (a) A single plate clutch with both sides effective, is required to transmit 25 kw at 900 rpm. The outer diameter of the plate is 350 mm. the maximum intensity of pressure over the friction surface is not to exceed 0.1 N/mm². Considering uniform wear criteria and assuming coefficient of friction as 0.25; determine (i) the inner diameter of the plate, (ii) axial force required to engage the clutch. 8

(b) Write any 7 design parameters of piston. 7

UNIT — IV

IX (a) A wheel has 48 teeths and a circular pitch of 24 mm. Find (i) pitch circle diameter, (ii) diametral pitch. 8

(b) Explain 7 terminologies of spur gears with a sketch. 7

OR

X (a) Draw the cam profile for following conditions :

Follower type = Knife edged, in-line; lift = 50mm; base circle radius = 50mm; out stroke with SHM, for 60° cam rotation; dwell for 45° cam rotation; return stroke with SHM, for 90° cam rotation; dwell for the remaining period, if the cam rotates at 1000 rpm in clockwise direction. 8

(b) List and explain different types of gears used for power transmission. 7