

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE — OCTOBER, 2018**

**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. What is a double slider crank chain ?
2. List various types of clutch.
3. Mention the peculiarity of chain drive.
4. What is meant by lift or stroke of a radial cam ?
5. Mention two disadvantages of gear box.

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. List the classification of bearings.
2. Sketch a single slider crank chain and mark parts.
3. Mention 6 types of light duty and medium duty keys.
4. Sketch and mark the parts in open belt drive and crossed belt drive.
5. List 6 applications of shaft couplings.
6. Enumerate 6 functions performed by clutch.
7. Sketch the displacement diagram when the follower moves with uniform velocity and mark the details.

(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) Write the design procedure for a new machine.            | 8 |
|     | (b) Sketch and explain the working of an elliptical trammel. | 7 |

OR

	Marks
IV (a) A solid shaft is transmitting 1 MW at 240 rpm. Determine the diameter of the shaft, if the maximum torque transmitted exceeds the mean torque by 20%. Take maximum allowable shear stress as 60 MPa.	8
(b) Give the classification of shafts.	7
UNIT — II	
V (a) Design a rectangular sunk key for a shaft of 60mm diameter. The permissible shear stress is 35 N/mm <sup>2</sup> and compression stress is 75 N/mm <sup>2</sup> .	8
(b) Give the classification of types of couplings.	7
OR	
VI (a) Two pulleys 60 cm and 40 cm diameters are connected by a belt. Central distance between the pulleys is 6 m. Find the length of belt required for (i) Open belt drive (ii) Closed belt drive.	8
(b) List 5 advantages and 2 disadvantages of chain drive.	7
UNIT — III	
VII (a) List design considerations for an I.C. engine piston.	8
(b) A single plate clutch with both sides effective has outer and inner diameters 300 mm and 200mm respectively. The maximum intensity of pressure at any point in the contact surface is not to exceed 0.1N/mm <sup>2</sup> . If the coefficient of friction is 0.3, determine the power transmitted by the clutch at a speed of 2500 r.p.m.	7
OR	
VIII (a) List design considerations for an I.C. engine connecting rod.	8
(b) A multiple disc clutch has 5 plates having 4 pairs of active friction surfaces. If the intensity of pressure is not to exceed 0.127 N/mm <sup>2</sup> , find the power transmitted at 500 r.p.m. The outer and inner radii of friction surfaces are 125 mm and 75mm respectively. Assume uniform wear and take coefficient of friction is 0.3.	7
UNIT — IV	
IX (a) A gear of 44 teeth has pitch circle diameter of 352mm. What is its module, circular pitch and dedendum ?	8
(b) Mention 5 advantages and 2 disadvantages of gear drive as compared to belt and chain drive.	7
OR	
X Draw the profile of a cam operating a knife edge follower from following data :	
(i) Lifts the follower through 40 mm during 60 degrees with S.H.M.	
(ii) The follower remains at rest for next 45 degrees of rotation of cam.	
(iii) The follower then descends to its original position during 90 degrees rotation of cam with S.H.M.	
(iv) The follower remains at rest for the remaining part of the revolution.	
List radius of the cam is 25mm.	15