

G 1589

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Fourth Semester

Branch : Mechanical Engineering

THEORY OF MACHINES-I (M)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Mercy Chance]

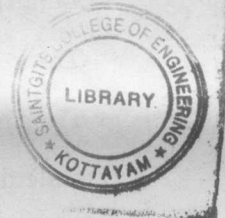
Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 4 marks.*

1. What is a Kinematic Pair ? Give examples for Kinematic Pair.
2. State and prove Kennedy's Theorem.
3. Briefly explain Type synthesis and Dimensional synthesis.
4. Briefly explain synthesis of slider crank mechanism.
5. Explain with help of an example about Pantograph.
6. Explain briefly Graishopper mechanism.
7. What is a brake ? Explain any *one* type of brake.
8. Explain with neat sketch about Pony brake dynamometers.
9. State and prove law of gearing.
10. Explain the term "Contact Ratio".



(10 × 4 = 40 marks)

Part B

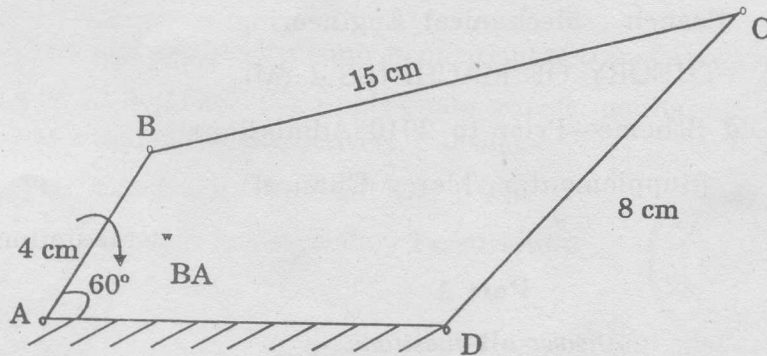
*Answer all questions.
Each full question carries 12 marks.*

11. Explain Elliptical Trammel and Scotch-Yoke mechanism.

Or

Turn over

12. In a four bar mechanism ABCD, AD is forced link and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal lengths. Find the angular velocity of link CD when angle BAD = 60° .



13. Synthesis a four-bar Crank-Rocker Quick return mechanism with following data :

Length of rocker = 21.5 cm

The rocker surging = 45°

Time ratio = 1 : 1.25

Calculate : (a) Radius ; (b) The coupler length.

Or

14. Explain graphical method for dimensional synthesis with suitable example.

15. Explain with neat sketch Davis and Ackerman steering mechanism.

Or

16. Two shafts are connected by a Hooke's joint. The driving shaft rotates at a uniform speed of 1200 r.p.m. The angle between the shaft is 15° . Calculate the maximum and minimum speeds of the driven shaft.

17. Explain the following with neat sketch :

(a) Hydraulic brake.

(b) Single plate clutch.

Its working and advantages.

Or



18. A Tourion dynamometer is fitted to the propeller shaft of a marine engine. The following data apply :

Length of shaft	=	20 m
Angle of twist	=	2°
r.p.m.	=	300.
Outside diameter of hollow shaft	=	300 mm
Inside diameter of hollow shaft	=	200 mm
Modulus of rigidity of shaft material	=	80×10^6 kPa.

Determine the power transmitted by the engine to the propeller.

19. A pinion having 20° involute teeth and 120 mm pitch circle diameter drives a rack. The addendum of both pinion and rack is 6 mm. Determine the least pressure angle which can be used to avoid interference. With this pressure angle find the contact ratio.

Or

20. Explain the various methods for avoiding interference in gears.

(5 × 12 = 60 marks)

