GANPAT UNIVERSITY

B. Tech. Semester: IV Marine Engineering

Regular Examination April – June 2015

2MR405 Theory of Machines

Time: 3 Hours

Total Marks: 70

Instruction: (1) Attempt all Questions.

(2) Assume suitable data if necessary.

(3) Figure to the right indicates full Marks.

(4) Start new Question on New Page.1

Section – I

Que. – 1	(a)	Explain different types of belt drive.	[6]
	(b)	Explain the Velocity ratio of compound Belt drive.	[6]

OR

Que. – 1   Derive the Equation of Ratio of tension in the belt.   [12]

Que. – 2	(a)	Derive the equation of kinetic energy of rotation.	[6]
	(b)	Derive the Equation of Centrifugal tension in the belt.	[5]

OR

Que. – 2   A belt 100 mm X 10 mm thick is transmitting power at 1200 m/min. The net   [11]
driving tension is 1.8 times the tension on the slack side. If the safe stress on
the belt section is 1.8N/mm^2, Calculate the power that can be transmitted at
this speed. Assume mass density of the leather as   1 t/m^3.also calculates
the absolute maximum power that can be transmitted by this belt and the
speed at which this can be transmitted

Que. – 3   A flat belt is required to transmit 35 kw from a pulley of 1.5m effective   [12]
diameter Running at 300 rpm. The angle of contact is spread over 11/24 of
the circumference and coefficient of friction between the belt and pulley
surface is 0.3. Taking centrifugal tension ratio into accont, determine the
width of belt. Take belt thickness as 9.5 mm, density as 1.1 Mg/m^3 and
permissible stress as 2.5 N/mm^2.

Section – II

Que. – 4	(a)	Classify followers and explain with neat sketch.	[6]
	(b)	Give difference between flywheel and governor.	[6]

OR

Que. – 4   Draw the profile of a cam rotating in anti clock wise direction and operating   [12]
a knife edge follower when the axis of the follower passes through the axis
of the cam shaft from following data:

1. Follower moves outwards through 30 mm during 90° of cam rotation.
2. Follower dwells for next 120°

3. Follower returns to its original position during next 150°
The displacement of the follower is to take place with SHM during outward stroke and with uniform velocity during inward stroke. The least radius of the cam is 50 mm.

Que. – 5 (a) Describe the power transmitted by a belt. [6]

(b) What is the condition for transmission of Maximum power? [5]

OR

Que. – 5 Draw the profile of a cam rotating in anti clock wise direction and operating a roller follower when the axis of the follower passes through the axis of the cam shaft from following data: [11]
1. Follower moves outwards through 50 mm during 120° of cam rotation.
2. Follower dwells for next 30°
3. Follower returns to its original position during next 90°
The displacement of the follower is to take place with SHM during outward stroke and with SHM during inward stroke. The least radius of the cam is 50 mm.

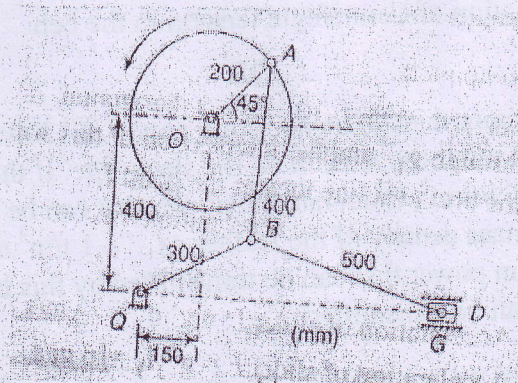Que. – 6 In the toggle mechanism shown in Fig. 1. The crank OA rotates at 210 rpm anticlockwise find the velocity of all the joints. [12]

Figure No. 1

END OF PAPER