

SUBJECT CODE NO:- P-4
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(MECH/PROD) Examination May/June 2017
Theory of Machines-II
(Revised)

[Time: Three Hours]

[Max.Marks:80]

Please check whether you have got the right question paper.

N.B

- i) Solve any three questions from each section.
- ii) Assume suitable data whenever necessary.

Section A

- Q.1 A Explain the interference & undercutting 05
B A pinion of 20 involute teeth & 125mm pitch circle diameter drives a rack. The addendum of both pinion & rack is 6.25mm what is the least pressure angle which can be used to avoid interference? With this pressure angle, find the length of arc of contact and the minimum number of teeth in contact at a time. 08
- Q.2 A Explain with neat sketch different types of gear trains 06
B The center distances between two meshing spiral gears is 260 mm & the angle between the shaft 65° 07
The normal circular pitch is $1\mu\text{mm}$ & the gear ratio 2.5. The driven gear has a helix angle of 35° , find.
i. The number of teeth on each wheel
ii. The exact center distance.
iii. The efficiency
Assuming friction angle to 5.5°
- Q.3 A Explain the function of governor 03
B Each arm of a porter governor is 250mm long. The upper slower arms are pivoted to links of 40mm & 50 mm respectively from the axis of rotation. Each ball has a mass of 5kg & the sleeve mass is 50 kg the force of friction on the sleeve of the mechanism is 40N. Determine the range of speed of the governor for extreme radii of rotation of 125mm & 130mm 10
- Q.4 A Define & explain the term "fluctuation energy" & "fluctuation of speed" as applied to flywheels. 05
B Riveting machine is driven by constant torque 3kw motor .The moving parts including the flywheel are 08
equivalent to 150 kg at 0.6m radius. One riveting operation takes 1 second and absorbs 10,000N-m of energy. The speed of the flywheel is 300rpm before riveting find the speed immediately after riveting.
How many rivets can be closed per minute?
- Q.5 A Describe the gyroscopic effect on ship 07
B An Aeroplane makes a complete half circle of 50 meters radius toward left when flying at 200 km/hr. 07
The rotary engine and propeller of the plane has a mass of 400kg & radius of gyration of 0.3m. The engine rotates at 2400rpm clockwise when viewed from the rear find gyroscopic couple & its effect

Section B

- Q.6 A Explain with neat sketch centrifugal clutch. 05
B A single dry plate clutch transmit 7.5kw at 900rpm. The axial pressure is limited to 0.07 N/M^2 if the 08
coefficient of friction is 0.25 find (1) mean radius & face width of the friction lining assuming the ratio of the mean radius to the mean radius to the face width as 4 & (2) outer & inner radii of the clutch plate.
- Q.7 A Discuss the relative merits & demerits of belt, rope & chain drives for transmission of power 05
B Obtain the expression for length of chain 08

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Q.8 A Define & explain

1. Damped vibration
2. Forced vibration
3. Resonance
4. Degree of freedom

05

B Determine the natural frequency of the spring mass pulley system shown in fig. 01

08

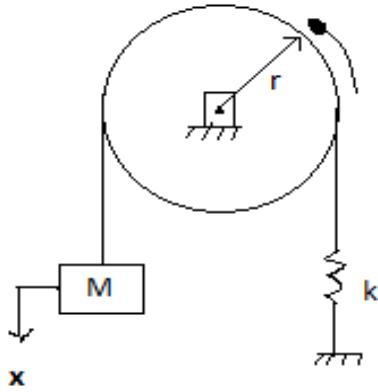


Fig-01

Q.9 A Explain the under damping, critical damping & over damping.

06

B In single degree damped vibrating system, a suspended mass of 8kg makes 30 oscillation in 18 seconds. The amplitude decrease to 0.25 of the initial value after 5 oscillations, determine

07

- a. Stiffness of the spring
- b. Logarithmic decrement
- c. Damping factor
- d. Damping coefficient.

Q.10 A Explain the magnification factor.

04

B Explain with neat sketch seismic instrument for measuring vibrations

04

C A single cylinder vertical diesel engine has a mass of 400kg & is mounted on a steel chassis frame.

06

The static deflection owing to the weight of the chassis is 2.4mm. The reciprocating masses of the engine amounts to 18kg & the stroke of the engine is 160mm. A dashpot with a damping coefficient of 2N/mm/s is also used to dampen the vibrations. In the steady state of the vibrations determine

- (i) amplitude of the vibration if the driving shaft rotate at 500 rpm
- (ii) Speed of the driving shaft when the resonance occurs.