Registration No :

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B.Tech.
PCME4204

4th Semester Back Examination 2017-18
KINEMATICS AND DYNAMICS OF MACHINES
BRANCH : AUTO, MECH
Time : 3 Hours
Max Marks : 70
Q.CODE : C1145

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions:** **(2 x 10)**
a) What do you mean by degree of freedom of a mechanism? How to determine it?
b) What do you mean by Dalemberts principle? State its significance?
c) What are the rules that may be used for locating instantaneous centre's in a mechanism?
d) What is reverted gear train? Where it is used?
e) What do you mean by uniform pressure and uniform wear theory?
f) What is Centrifugal tension in a belt? How does it affect the power transmitted?
g) What is the functional difference between brake and clutch?
h) What do you mean by Chordal action with respect to chain drive?
i) State the condition of correct steering.
j) What do you mean by Coriolis component of acceleration? Explain with a neat sketch.

Q2 In a slider crank mechanism, crank radius 150mm, length of the connecting rod 600mm, crank angle 45^0 , crank speed 300 rpm in clockwise direction. Determine the angular positions, angular velocities, and angular acceleration of all the members of the above mentioned slider crank mechanism. And also find the position, velocity and acceleration of the piston. **(10)**

Q3 A vertical cylinder petrol engine has a cylinder diameter of 120mm and stroke 150mm.The length of the connecting rod between the centres is 250mm, the mass of the piston is 1.2kg.The speed of the engine is 1500 rpm. In the expansion with a crank at 30^0 from the dead centre, the gas pressure is $700KN/m^2$ .Determine the force acting on the connecting rod and the crank effort. **(10)**

Q4 A multiple friction clutch has to be designed to transmit 75KW from an engine rotating at 2000rev/min. The inner and outer diameter are respectively 100mm and 150mm, the pressure to be assumed uniform $160KN/m^2$ and μ=0.25.Determine the necessary end thrust and the number of clutch plates required. If this clutch is then used to transmit power from a larger engine to a rotor which has a mass of 1150kg and a radius of gyration of 200mm, determine the line required for this rotor to reach 1500 rev/min from standstill, assuming that the clutch is transmitting the maximum possible torque. **(10)**

Q5   Two shafts A and B are coaxial.A gear C (50 teeth) is rigidly mounted on a shaft A.A compound gear D-E gears with C and an internal gear G.D has 22 teeth and gears with C and E has 36 teeth and gears with an internal gear G .The gear G is fixed and is concentric with the shaft axis. The compound gear D-E is mounted on a pin which projects from an arm keyed to the shaft B. Sketch the arrangement   and find the number of teeth an internal gear G assuming that all gears have the same module. If the shaft A rotates at 110rpm, find the speed of shaft B. **(10)**

Q6 **a)**   Describe with the help of neat sketch the principle of operation of an internal expanding shoe brake. **(5)**

     b)   Explain with figure about rope brake dynamometer. **(5)**

Q7   What do you mean by self hauling and self locking of screws? The mean diameter of a square threaded screw jack is 50mm.The pitch of the thread is 10mm.The coefficient of friction is 0.15.What force must be applied at the end of a 0.7m longitudinal axis of the screw to raise a load of 20KN and to lower it? **(10)**

Q8   **Write short answer on any TWO :** **(5 x 2)**
    a)   Kinematic chain
    b)   Kennedy theorem
    c)   Correction couple
    d)   Equivalent dynamical system