Registration No: | | | | | | | | | | |

Total Number of Pages: 02 **B.TECH**

PME3I104

3rd Semester Regular / Back Examination 2017-18
KINEMATICS & DYNAMICS OF MACHINES
BRANCH: MECH
Time: 3 Hours
Max Marks: 100
Q.CODE: B976

Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions: multiple type or dash fill up type** **(2 x 10)**

a) In a kinematic chain, a quaternary joint is equivalent to
(a) one binary joint (b) two binary joints (c) three binary joints (d) four binary joints

b) The angle of inclination of the plane, at which the body begins to move down the plane, is called
(a) angle of friction (b) angle of repose (c) angle of projection

c) The component of the acceleration, parallel to the velocity of the particle, at the given instant is called…….

d) When the crank is at the inner dead centre, in a horizontal reciprocating steam engine, then the velocity of the piston will be……

e) In an engine, the work done by inertia forces in a cycle is……

f) The brake commonly used in motor cars is
(a) shoe brake (b) band brake
(c) band and block brake (d) internal

g) Which of the following is an absorption type dynamometer ?
(a) prony brake dynamometer (b) rope brake dynamometer
(c) epicyclic-train dynamometer (d) torsion dynamometer

h) An imaginary circle which by pure rolling action, gives the same motion as the actual gear, is called
(a) addendum circle (b) dedendum circle (c) pitch circle (d) clearance circle

i) The type of gears used to connect two non-parallel non-intersecting shafts are
(a) spur gears (b) helical gears (c) spiral gears (d) none of these

j) The centrifugal tension in belts
(a) increases power transmitted
(b) decreases power transmitted
(c) have no effect on the power transmitted
(d) increases power transmitted upto a certain speed and then decreases

Q2 **Answer the following questions: Short answer type** **(2 x 10)**

a) Distinguish between complete, incomplete & successful constrained of relative motion between two elements of link.

b) What is kinematic pair? What are the lower and higher pairs? Give two examples

c) What do you mean by friction circle?

d) What do you mean by velocity and acceleration images?

e) What is the use of Oldham coupling?

f) Briefly describe one of the absorption type dynamometer

g) What are the advantages and disadvantages, when co-efficient of friction in screw jack increases

h) What are the two theories applied to friction clutch and under what condition these are used.

i) Write brief note on reverted gear train.

j) What is compound pendulum

Part – B (Answer any four questions)

Q3 **a)** Explain whit worth quick return mechanism (with sketch). **(10)**

b) What is inversion? With neat sketch explain two inversion of double slider crank chain. **(5)**

Q4 **a)** A load of 25 kN is raised by screw jack, having square thread screw 12 mm pitch and mean diameter of 50 mm. If a force of 100 N is required to raise the load, (i) what should be length of lever? (ii) What is the MA? (Take μ=0.15) **(10)**

b) Sketch and describe a multi-disc clutch. **(5)**

Q5 **a)** In band and block brake, the band is lined with 12 blocks, each of which subtends angle 15^0 at the centre of rotating drum. When the brake is an action, derive the ratio of greatest tension (T_1) and least tension (T_2). **(10)**

b) Explain (with neat sketch) the transmission dynamometer. **(5)**

Q6 **a)** An epicycle gear consists of the three gears, A, B, & C. The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm, which rotates about the centre A at 18 rpm. If gear A is fixed, determine the speed of gears B & C **(10)**

b) With neat sketch, describe the differential gear of an automobile. **(5)**

Q7 **a)** Derive an expression for the inertia force due to reciprocating mass in reciprocating engine, neglecting the mass of the connecting rod. **(10)**

b) What do you mean by dynamically equivalent system? Explain. **(5)**

Q8 **a)** Expalin the Coriolis component of acceleration. **(10)**

b) State and prove Kennedy theorem. **(5)**

Q9 **a)** Determine the width of 10 mm thick belt, is used for transmitting 15 kW power from a motor running at 900 rpm. The diameter of driving pulley is 300 mm. The driven pulley runs at 300 rpm & distance between the centers of pulley is 3 meters. (Take μ=0.3, density of belt material =1000 kg/m^3 and allowable stress for the belt material=25 MPa) **(10)**

b) What is the advantages and disadvantages of V-belt drive over flat belt drive? **(5)**