Registration no: | | | | | | | | | | |

Total Number of Pages: 02 **M.TECH**
MDPE202

2nd Sem M.Tech Regular/ Back Examination – 2014-15
MECHANICAL DRIVES
BRANCH(S): MECHANICAL ENGG.
Time: 3 Hours
Max marks: 70
Q.CODE:T305

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

a) What are the Interdepartmental transporting facilities available in plants?
b) What are the Unit loads and Bulk load in Transmission systems, Explain with examples?
c) How to calculate the hourly capacity of a hoisting machine?
d) What are the medium available to operates the brakes, Gives some examples?
e) What are the thermal considerations in brake design?
f) What are the materials used for lining of friction surfaces of clutches?
g) What condition must be satisfied in order that a pair of spur gears may have a constant velocity ration?
h) What are the various forces acting on worm and worm gears?
i) What are rail travelling gear mechanisms?
j) What are the difference Programmed Motion and intermittent motion?

Q2 a) What are the principal factors affecting to choose the Transmission equipments? (5)
b) Classified Different surface and overhead hoisting equipments (5)

Q3 a) Give a brief description of various general advantages wire ropes over welded load chains of hoisting machines (5)
b) How design Matching of load for surface hoisting equipments (5)

Q4 Design a forged single crane hook assembly for a capacity of 5,000 kg. Choose trapezoidal cross-section with grabbing tongs of 1000 kg. Choose the suitable values the stress. (10)

Q5 A single plate clutch is required to transmit 8 kW at 1000 rpm. The axial pressure is limited to 70 kN/ m^2. The mean radius of the plate is 4.5 times the radial width of the friction surface. If both the sides of the plate are effective and the coefficient of friction is 0.25, find (a)The inner and the outer radii of the plate and the mean radius. (b)The width of the friction lining. (10)

Q6 The double block brake is required to bring a brake drum to rest within 5 seconds. The diameter of the brake drum is 600 mm and it is rotating at 300 r.p.m. The brake has to absorb 100 kN m of energy each time when it is applied. The bearing pressure between the block and the drum is limited to 0.5 MPa. Determine the brake actuating force required at the of the brake lever 1000 mm long. The distance between two fulcrums is 460 mm and the axis of the drum shaft is 350 mm from the line joining two fulcrums. Design the size of the shoe, the size of the pivot pin for the shoe and the cross sectional dimensions for the critical section of the lever. Take friction coefficients as 0.3 (10)

Q7 Design and determine the input power capacity of a worm gear speed reducer unit composed of a hardened steel worm and a phosphor bronze worm wheel having 20^0 stub involutes teeth. The centre distance is to be 200 mm, the transmission ration is to be 10 and the worm speed is to be 1450 rpm. (10)

Q8 Answer any two from the followings Questions (5 x 2)

a) Write brief description of design ratchet pawls.
b) What are the dynamic loads of operating of hoisting gear during transient motion?
c) What are Gantry cranes?
d) What is Shackles and where is it used?