Sanjay Ghodawat University, Kolhapur
Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2018-19
EXM/P/09/01

Year and Program:2018-19 | **School of Technology** | **Department of FY B.Tech**
Course Code: FYT104 | **Course Title: Engineering Mechanics (Old)** | **Semester – I**
Day and Date Saturday 08/06/2019 | **End Semester Examination (ESE)** | **Time:** 10.30 am to 1.30 pm **Max Marks: 100**

Instructions:
1) All questions are compulsory.
2) assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

Q.1		**Solve the following**	Marks	Bloom's Level	CO
	a)	Explain the Following 1. Force and its characteristics 2. Lami's Theorem	08	L_2	CO1
	b)	The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant force.	10	L_3	CO1
		OR			
	b)	A circular roller of weight 100N and radius 10cm hangs by a tie rod AB = 20cm and rest against smooth vertical wall at C as shown in fig.1. Determine force in tie rod and reaction Rc at point C.	10	L_3	CO1

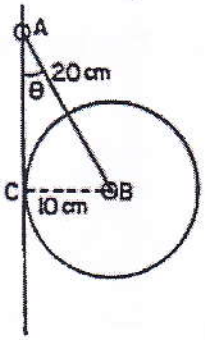

Fig.1.

Q.2	a)	Explain Gravity axis, centroid, centre of gravity, centre of mass.	06	L_2	CO2
	b)	A coplanar force system subjected to forces on the plate element as shown in fig.2. determine 1. Resultant in magnitude and direction 2. x and y intercepts of the resultant	10	L_3	CO2

ESE

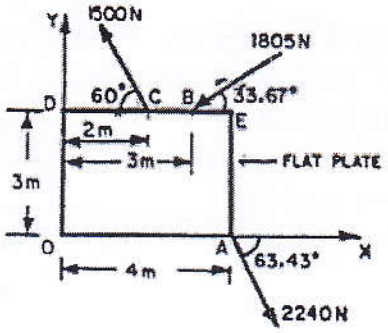

Fig.2.

OR

b) A semicircular area is removed from a trapezium as shown in Fig.3 (dimensions in mm). Determine the centroid of the remaining area — 10 — L_3 — CO2

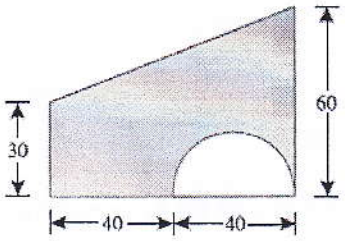

fig. 3.

Q.3 a) Explain the Following — 06 — L_3 — CO3

1. Parallel axis theorem
2. Polar moment of inertia

b) Determine the forces in all the members of the truss shown in Fig.4 and indicate the magnitude and nature of forces on the diagram of the truss. All inclined members are at 60° to horizontal and length of each member is 2 m. — 10 — L_3 — CO3

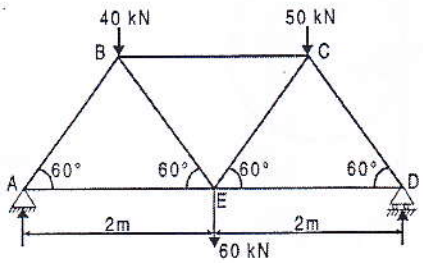

Fig.4

Q.4 a) 1.Dependent Motion
2. Relative Motion — 06 — L_2 — CO4

b) A train has a weight of 3500kN. The frictional resistance amount od 5N per kN, what steady pull must the locomotive exerts in order to increase the speed on the level track from 36 kmph to 72 kmph within a period of 2 minutes? — 10 — L_3 — CO4

ESE

OR

	b)	Block A and B weighing 10N and 4N respectively are connected by a weightless rope passing over a frictionless pulley and are placed are smooth inclined surface making an angle 600 and 450 with horizontal surface as shown in fig 5. Determine tension in string and velocity of system after 3 sec. staring from rest.	10	L_3	CO4

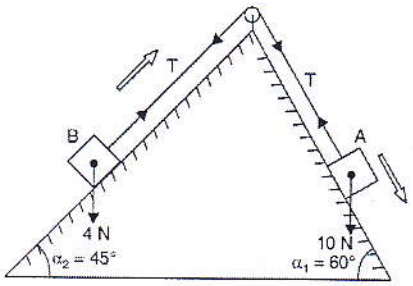

Fig.5.

Q.5	a)	Explain the following term 1.Kepler's law of planetary motion 2. Dynamic Equilibrium	08	L_2	CO5
	b)	A stationary flywheel of 0.5m diameter is subjected to a constant torque of 200Nm, so that wheel attains a speed of 100 r.p.m. in three minutes of time. Determine 1. Angular acceleration 2. No. of revolution made in this time 3. Work done to attain the speed. 4. Circumferential speed of wheel at 100 r.p.m.	10	L_2	CO5
Q.6	a)	Prove that coefficient of restitution e = 1 for perfectly elastic material.	06	L_2	CO6
	b)	A pile of mass 500 kg is driven in to ground by dropping freely hammer of mass 318 kg through a height of 2.7m. if the pile is driven into the ground by 0.15m, calculate average resistance of the soil	10	L_2	CO6

OR

	b)	A hand ball of mass 0.050 kg is dropped from a height H = 3m. The coefficient of restitution for the impact between ball and floor is 0.75. a) Determine velocity of ball at the instant before it strikes the floor Determine velocity of ball at the instant after it rebound.	10	L_2	CO6