University of Technology
Department of Applied Sciences
Final Examination 2016/2017

Subject: Mechanic
Branch: Laser
Examiner: Dr. Jehan Admon

Class: 1 st year
Time: 3 hours
Date: / / 2017

Note: Answer only five questions

Q1/ **A)** A projectile is shot at an angle of 40°. It strikes the ground at a horizontal distance of 5km from the gun. Calculate **(a)** the time of flight and **(b)** the maximum height. **(6 marks)**

B) Compare between harmonic and an harmonic oscillations. **(4 marks)**

Q2/ **A)** A sphere roll down along an inclined plane starting at a height 5m. Find the velocity when it arrive at the base of the plane (y =3m). **(7 marks)**

B) Classify the frictional forces depending on the type of materials. **(3 marks)**

Q3/ **A)** Find the area of the parallelogram determined by the vectors

$A = 6u_x + 9u_y - 3u_z$ and $B = -3u_x + 3u_y + 6u_z$ **(5 marks)**

B) Define the following:

Isotopes, elastic constant, rigid body, torque, period. **(5 marks)**

Q4/ **A)** A particle is subjected simultaneously to two SHM of the same frequency and direction. Their equations are

$x_1 = 15\sin(5t + \pi/3)$ and $x_2 = 10\sin(5t + \pi/2)$

Find the resultant motion. **(7 marks)**

B) State the interesting features for particles. **(3 marks)**

University of Technology
Department of Applied Sciences
Final Examination 2016/2017

Subject: Mechanic
Branch: Laser
Examiner: Dr. Jehan Admon

Class: 1 st year
Time: 3 hours
Date: / / 2017

Q5/ A) The degree of banking the railroad is 7°. The radius of the curve is 300m. Determine the velocity of a train must has in order that the train will experience no sidewise. **(6 marks)**

B) Find the angle between two vectors **A** and **B,** if you know that the scalar product of the two vectors is equal to the vector product of them. **(4 marks)**

Q6/ A) A ball whose mass is 200 gm is allowed to fall from a 4m height and after hitting the floor, it bounce back up to a height of 3.5m. Determine the impulse it received from gravity while it was falling and the impulse it received when it struck the floor. **(6 marks)**

B) In which cases the work done by the force equal to zero? Why? **(2 marks)**

C) How we can represent vectors? **(2 marks)**

Good Luck