

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

$$A = 6u_x + 9u_y - 3u_z \quad \text{and} \quad B = -3u_x + 3u_y + 6u_z \quad (5 \text{ marks})$$

B) Define the following:

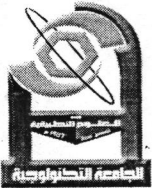
Isotopes, elastic constant, rigid body, torque, period. (5 marks)

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

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

Find the resultant motion. (7 marks)

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



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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