

Premier University
Department of Computer Science and Engineering
Suggestions for CSE 1st Semester Retake Examination, June 2020
Course Title : Engineering Physics – I
Course No. : PHY-101

Q1.	a)	Define simple harmonic motion.	1
	b)	Find an expression for the total energy of simple harmonic motion.	3
	c)	A body oscillates with simple harmonic motion according to the equation: $y = 10 \sin (8\pi t + \pi/3)$ meters. Find the following terms: displacement, velocity and acceleration at the time $t=3$ sec.	3
Q2.	a)	Derive an expression for displacement of a particle executing SHM.	4
	b)	A particle performs simple harmonic motion given by the equation. If the time period is 20 seconds and the particle has a displacement of 10 cm at $t=0$, find (i) epoch (ii) the phase angle at $t=5$ seconds and (iii) the phase difference between two positions of the particle 15 seconds apart.	3
Q3.	a)	What are Lissajous figures?	1
	b)	Obtain an expression for the Lissajous figure when two simple harmonic vibrations of equal time periods acting right angles to each other's.	4
	c)	Discuss the special cases when the phase difference between the waves and draw the corresponding diagrams: (i) $\alpha = 2\pi$ and (ii) $\alpha = 3\pi/4$	2
Q4.	a)	What is Doppler effect?	1
	b)	Calculate the apparent pitch of a note due to the motion of both the source and the	4

		observer.	
	c)	A person is standing near a railway track and a train moving with a speed of 54 km/hr is approaching him. The apparent pitch of the whistle as heard by the person is 1000 Hz. Calculate the actual frequency of the whistle. velocity of sound 335 m/s.	2
Q5.	a)	What is Carnot's cycle?	1
	b)	Draw a Carnot cycle and find the total work done of a complete Carnot cycle.	4
	c)	Calculate the efficiency of a Carnot engine working between the temperatures 125° and 65° .	2
Q6.	a)	Find the Expression of work done for isothermal process?	4
	b)	A quantity of air at 30° and atmospheric pressure is suddenly expand double of its original volume. Find the resulting temperature.	3
Q7.	a)	State first law and second law of thermodynamics.	2
	b)	What is mechanical equivalent of heat?	2
	c)	Determine the value of J, the mechanical equivalent of heat from the following data: 1600 Cal of heat are supplied to a system, the system does 2000 joules of external work during that time. The increase in internal energy during the process is 4000 joules.	3
Q8.	a)	Define simple harmonic motion?	1
	b)	Obtain the differential equation for the motion of a simple harmonic motion.	4
	c)	A body oscillates with simple harmonic motion according to the equation: $y = 15 \sin (10t - \pi/6)$ meters Calculate: (i) The frequency (ii) The time period (iii) The maximum displacement. (iv) The maximum velocity (v) The maximum acceleration	2

Q9.	a)	According to Doppler effect, derive an expression for the change in frequency of a note when the source at rest and the observer in motion.	4
	b)	An observer on a railway platform noticed that when a train passed through the station, at a speed of 72 km/hr, the frequency of the whistle appeared to drop by 600 Hz. Calculate the actual frequency of the note given by the whistle. Velocity of sound in air=340 m/s.	3
Q10	a)	Define entropy? Obtain an expression of entropy for a adiabatic reversible system.	4
	b)	1 kg water at 100° C at is mixed with 1 kg of water at 0°C, the common temperature being 50°C. What is the change of entropy?	3