BST 101- Engg. Physics

Full Marks: 80   Time: 3 Hours

Answer any Five Questions including Q No. 1& 2

Figures in the right hand margin indicates marks

1.	Answer ALL Questions:	2x10
	a. Write down Dimensional formulae for the following quantities.	
	(i) Pressure	
	(ii) Universal Gravitational Constant(G)	
	b. Find $\vec{A}.\vec{B}$ if $\vec{A}$ = 2i+3j-k and $\vec{B}$ = 3i-2k	
	c. Write the relation between (i) Linear & Angular Velocity (ii) Linear & Angular Acceleration.	
	d. What do you mean by Limiting Friction?	
	e. Define Weight. Write down its unit.	
	f. What is the relation between wavelength and frequency of a wave?	
	g. State any two differences between heat and temperature.	
	h. Define Critical Angle.	
	i. Find the equivalent Capacitance if a 2µF Capacitor is connected parallel with a 0.5 µF capacitor.	
	j. Define Population Inversion of LASER.	
2.	Answer any SIX questions:	5x6
	a. With a neat diagram explain resolution a vector.	
	b. Define Circular motion. Find the expression for Angular Displacement and Angular Velocity of a particle executing circular motion.	
	c. Define Co-efficient of Friction. Write methods for reducing friction.	
	d. State Kepler's laws of planetary motion.	
	e. A 500g cube of lead is heated from 25^0C to 75^0C. How much energy was required to heat the lead? Sp. Heat of lead is 0.129 J/g^{0}C.	
	f. State & Explain with diagram the Kirchhoff's laws of Electric current.	
	g. State the Faradays laws of Electromagnetic induction.	
	h. Write down the Characteristics & Application of LASER.	
3.	Define Projectile. Derive Expression for equation of Trajectory, Maximum Height and Total time of flight for a Projectile fired at an angle θ with the horizontal.	10
4.	State laws of Limiting Friction. An object of 1Kg rests on a horizontal floor. The Co-efficient of Static Friction is 0.4 and g is 9.8 m/s^2. Calculate the force of static friction.	10
5.	Differentiate between Mass & Weight. What is the value of acceleration due to gravity at a height 40Km above earth's surface? Diameter of Earth = 12800 Km.	10
6.	Define Wave motion. Differentiate between Transverse & Longitudinal Wave. If the frequency of Tuning fork is 400 Hz and the velocity of sound in air is 320 m/s. Find the wavelength of the wave.	10
7.	Derive an expression for force acting on a current carrying Conductor placed in a uniform magnetic field. Write any two properties of ULTRASONICS.	10