FINAL RUBRICS: HSSC 1st ANNUAL EXAMINATION 2023
SUBJECT: PHYSICS HSSC-I (Local)

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)
2(i)	Differentiate between precision and accuracy	Any three correct differences (03)	Any two correct differences (02)	Any one correct difference (01)	Wrong answer (0)		
2(ii)	Explanation of lifting heavy loads by crane without toppling	Correct reasoning including • Large base area • Low centre of gravity • Line of action of weight passes through base or any other correct complete reason (03)	Any two correct points (02)	Any one correct point OR some relevant information (01)	Wrong answer (0)		
2(iii)	Checking dimensional correctness of equation E = hf	Correct proof (03)	Partially correct proof (02)	Some relevant steps (01)	Wrong answer (0)		
2(iv)	Co-relating of Newton's third law and conservation of momentum with example	Correctly relating Newton's third law and conservation of momentum with the help of example like of rocket motion, water sprinkle etc. (03)	Partially correct explanation of example OR stating both laws (02)	Stating any one law OR any relevant correct information of example information (01)	Wrong answer (0)		
2(v)	Definition of impulsive force	Correct definition (01)	Partially correct definition (0.5)	Wrong answer (0)			
	Effect of increase of collision time on impulsive force	Correctly relating force and time (01)	Partially correct (0.5)	Wrong answer (0)			
	Example	Relevant correct example with short explanation (01)	Partially correct (0.5)	Wrong answer (0)			
2(vi)	Mathematical expression for horizontal component of velocity and vertical component of velocity of projectile	Writing Both correct equations of velocities (01)	Any one correct equation (0.5)	Wrong answer (0)			
	Effect of gravity on these velocity components	Correct explanation of both components of velocity (02)	Correct explanation of any one components of velocity (01)	Some relevant information (0.5)	Wrong answer (0)		

2(vii)	Description of work done equal to area under force and displacement graph	Correct proof with labeled force (constant OR variable) displacement graph (03)	Partially correct (02)	Some relevant information e.g labeled diagram or one relevant mathematical step (01)	Wrong answer (0)		
2(viii)	Definition of escape velocity	Correct definition (01)	Partially correct (0.5)	Wrong answer (0)			
	Proof of escape velocity formula	Correct proof (02)	Partially correct with at least two correct mathematical steps (01)	Any correct step (0.5)	Wrong answer (0)		
2 (ix)	Explaining the need of riffling of rifle barrel by using law of conservation of angular momentum	Correct reasoning (03)	Partially correct reasoning (02)	Some relevant information (01)	Wrong answer (0)		
2(x)	(a) Moment of inertia (explanation)	Correct explanation OR definition of moment of inertia and formula (1.5)	Partially correct explanation (01)	Some relevant information (0.5)	Wrong answer (0)		
	(b) Angular momentum (explanation)	Correct explanation OR definition of angular momentum and formula (1.5)	Partially correct explanation (01)	Some relevant information (0.5)	Wrong answer (0)		
2(xi)	Attaining earlier terminal velocity by heavier or lighter object	Correct reasoning (03)	Partially correct (02)	Some relevant information (01)	Wrong answer (0)		
2(xii)	Calculation of one reaction force	Correct calculation (1.5)	Partially correct response (01)	Some relevant information/steps (0.5)	Wrong answer (0)		
	Calculation of second reaction force	Correct calculation (1.5)	Partially correct response (01)	Some relevant information/steps (0.5)	Wrong answer (0)		
2(xiii)	Derivation of frequency of orbiting satellites to produced artificial gravity	Correct derivation of frequency of orbiting satellites to produced artificial gravity (03)	Partially correct with at least three mathematical steps (02)	At least two correct mathematical step (01)	Some relevant information (0.5)	Wrong answer (0)	
2(xiv)	Frequency of simple pendulum	Correct calculation with answer and unit (03)	Partially correct (02)	Some relevant information (01)	Wrong answer (0)		
2(xv)	Difference between progressive waves and stationary waves	Any two correct differences (02)	Any one correct difference (01)	Some relevant information (0.5)	Wrong answer (0)		
	Examples of progressive waves and stationary waves	Two correct examples of each wave (01)	One correct example (0.5)	Wrong answer (0)			

2(xvi)	Discussion of first mode of vibration in stretched string	Correct description (01)	Partially correct (0.5)	Wrong answer (0)			
	Derivation of frequency of first mode of vibration	Correct derivation of frequency of first mode of vibration with figure (02)	Partially correct (01)	Some relevant steps (0.5)	Wrong answer (0)		
2(xvii)	Path difference with reference to interference of two waves	Correct explanation e.g. Definition of path difference w.r.t. concept of interference of two waves with correct/ suitable figures OR Discussing conditions for maxima and minima in term of path difference or any other correct explanation (03)	Partially correct explanation (02)	Some relevant information (01)	Wrong answer (0)		
2(xviii)	Statement of Huygen's Principle	Correct statement (01)	Partially correct (0.5)	Wrong answer (0)			
	Constructing new wave front by using Huygen's Principle	Correct description with figure (02)	Partially correct without figure (01)	Some relevant information (0.5)	Wrong answer (0)		
2(xix)	Explanation on degradation of energy in all natural processes	Correct response and correct explanation (03)	Correct response with partially correct explanation (02)	Some relevant information (01)	Wrong (0)		
2(xx)	Angular momentum of moon	Correct calculation with correct answer and unit (03)	Partially correct (02)	Some relevant steps (01)	Wrong answer (0)		
3(a)	Calculation of potential at a point	Complete derivation with figure (05)	Correct derivation without figure (04)	Partially correct derivation with figure (03)	Partially correct derivation (02)	Some relevant information (01)	Wrong answer (0)
3(b)	Differentiate between	Any one correct difference (02)	Partially correct (01)	Wrong answer (0)			

	molar specific heats at constant pressure and at constant volume						
	Molar specific heat at constant pressure is greater than molar specific heat at constant volume	Correct reason (02)	Partially correct (01)	Some relevant information (0.5)	Wrong answer (0)		
	Proof of $C_p - C_p = R$	Correct proof involving calculation internal energy, first law of thermodynamics, general gas equation etc. (04)	Partially correct with at least two correct calculations mentioned in level 1 (03)	One correct calculation mentioned in level 1 (02)	Some relevant information (01)	Wrong answer (0)	
4(a)	Description of S.H.M.	Correct description (01)	Partially correct (0.5)	Wrong answer (0)			
	Prove that projection of a body moving in a circular path executes S.H.M	Correct proof of that projection of a body moving in a circular path executes S.H.M with figure (04)	Correct proof of that projection of a body moving in a circular path executes S.H.M without figure (03)	Partially correct with at least three correct mathematical steps (02)	At least two correct mathematical steps OR correct figure (01)	Wrong answer (0)	
	Derivation of time period	Correct derivation of time period (01)	Partially correct (0.5)	Wrong answer (0)			
	Derivation of frequency	Correct derivation of frequency (01)	Partially correct (0.5)	Wrong answer (0)			
4 (b)	Effect on the apparent pitch heard by the observer when both source of sound and observer moving towards each other	Correct description with all the correct mathematical steps and correct result of apparent pitch (03)	Satisfying at least two points mentioned in level 1 (02)	Satisfying at least two points mentioned in level 1 (01)	Wrong answer (0)		
	Effect on the apparent pitch heard by the observer when both source of sound and observer moving away each other	Correct description with all the correct mathematical steps and correct result of apparent pitch (03)	Satisfying at least two points mentioned in level 1 (02)	Satisfying at least two points mentioned in level 1 (01)	Wrong answer (0)		
5 (a)	Statement of Bernoulli's equation	Correct statement (01)	Partially correct (0.5)	Wrong answer (0)			

	Derivation of Bernoulli's equation	Correct derivation with figure (05)	Correct derivation without figure (04)	Half correct derivation e.g. deriving equation for work done on the fluid (03)	Some relevant steps (02)	Correct labeled figure (01)	Wrong answer (0)
	Application of Bernoulli's equation	Correct explanation or derivation of any one application (02)	Partially correct (01)	Some relevant mathematical steps OR information (0.5)	Wrong answer (0)		
5 (b)							
	Calculation of magnitude of resultant for angle 0^o	Correct calculation with correct answer and unit (2.5)	Partially correct calculation (02)	Some relevant steps (01)	Wrong answer (0)		
	Calculation of magnitude of resultant for angle 120^o	Correct calculation with correct answer and unit (2.5)	Partially correct calculation (02)	Some relevant steps (01)	Wrong answer (0)		

Note: All the markers must know the solutions of all the question items of the question paper before starting marking.