**FINAL RUBRICS: HSSC 1st ANNUAL EXAMINATION 2022**

**SUBJECT: PHYSICS HSSC-I (Local)**

**(Rubrics by SC Dated: 15/7/2022)**

 These rubrics and objective paper solutions are finalized after incorporating suggestions by HEs and secrecy department as informed by the MPDU.

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| **Q.# /Part #** | **Criteria**  | **Level 1 (Marks)** | **Level 2(Marks)** | **Level 3 (Marks)** | **Level 4 (Marks)** | **Level 5 (Marks)** |
| 2(i) | Dimensions of coefficient of viscosity  | Finding Correct Dimensions (3) | Partially correct Dimensions (2) | Some Correct Mathematical Steps (1) | Wrong answer (0) |  |
| 2(ii)  | Sum with Head to Tail Rule | Correct Diagram for their vector sum (1.5) | Partially Correct Diagram (1) | Some relevant information (0.5) | Wrong answer (0) |  |
| Difference with Head to Tail Rule | Correct Diagram for their vector difference (1.5) | Partially Correct Diagram (1) | Some relevant information (0.5) | Wrong answer (0) |  |
| 2(iii) | Data | Correct data (1) | Partially correct data (0.5) | Wrong answer (0) |  |  |
| │**A . B**│ | Applying Correct Formula and Correct Calculation (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| │**A x B**│ | Applying Correct Formula and Correct Calculation (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| 2(iv) | Description for a Parallel to v | Correct Description i,e velocity of car is increasing (1.5) | Partially correct response (1) | Some relevant information (0.5) | Wrong answer (0) |  |
| Description for a Anti parallel to v | Correct Description i,e velocity of car is decreasing (1.5) | Partially correct response (1) | Some relevant information (0.5) | Wrong answer (0) |  |
|  2(v) | Condition | Correct Condition with formulae i,e R=4H (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Calculation for angle | Correct calculation of angle (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(vi) | Scientific Reasoning  | Correct explaining that air resistance causes dissipation of heat energy (3) | Partially correct (2) | Some relevant information (1) | Wrong answer (0) |  |
|  2(vii) | Derivation of power formula | Correctly deriving P = **F**.**v** (3) | Partially correct derivation (2) | Some Correct Mathematical Steps (1) | Wrong answer (0) |  |
| 2(viii) | Deriving the formula for orbital velocity  | Correct derivation (2) | Partially correct (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| Proof of relation vo  | Correct derivation (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| 2(ix) | Extraction of Data | Correct Extraction of Data (1) | Partially correct response (0.5) | Wrong answer (0) |
| Calculation  | Correct calculation of moment of inertia, angular velocity and rotational K.E. (2)  | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(x) | Scientific Reasoning  | Correct reasoning i,e (P$∝\frac{1}{V}$ )air pressure difference is created at opposite sides of ball which produces force from high to low pressure region (3) | Partially correct reasoning (2) | Some relevant information (1) | Wrong answer (0) |  |
| 2(xi) | Definition of Banking of roads  | Correct definition (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Derivation of Formula of banking of roads | Correct Derivation of Formula (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(xii) | Extraction of Data | Correct Extraction of Data (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Calculation of wavelength  | Correct calculation (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(xiii) | Condition | Correct condition i.e after cutting into half, new spring constant becomes 2k (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Formula and Calculation of frequency ratio | Correct Formula and Calculation (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(xiv) | Formula | Correct formula i.e $v=\sqrt{\frac{E}{ρ}}$ (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Explanation  | Correctly explaining on the basis of modulus of elasticity E for solids is greater than gases and then discussing the ratio of $E/ρ$ etc. (2) | Partially correct response (1) | Some relevant information (0.5) | Wrong answer (0) |  |
| 2(xv) | Extraction of Data | Correct Extraction of Data and formula (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Calculation of wavelength  | Correct calculation (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(xvi) | Formula | Correct formula i.e $v∝\frac{1}{\sqrt{ρ} }$(1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Comparing speed of sound in H2 and O2 gases | Correct calculation (2) | Partially correct response (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 2(xvii) | Scientific Reasoning | Correct Reasoning i.e explanation on the basis of interference of light(3) | Partially correct response (2) | Some relevant information (1) | Wrong answer (0) |  |
|  |  |  |  |  |
| 2(xviii) | Scientific Reasoning | Correct Reasoning by explanation of decrease in fringe spacing inside water due to decrease in wavelength (3) | Partially correct response (2) | Some relevant information (1) | Wrong answer (0) |  |
| 2(xix) | Working principle of Carnot engine | Correctly explaining four processes of Carnot cycle with correct PV graph (3) | Partially correct response (2) | Some relevant information (1) | Wrong answer (0) |  |
| 2(xx) | Explanation of degradation of energy  | Correctly explaining that increase in entropy will degrade the energy (3) | Partially correct response (2) | Some relevant information (1) | Wrong answer (0) |  |
| 3(a) | Scalar product definition  | Correct definition (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Figure of scalar product  | Correctly showing both vectors and component of 2nd vector in direction of 1st vector (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Explanation  | Correctly explaining above figure or physical significance or at least one correct example or any one of the characteristics (0.5) | Wrong answer (0) |  |  |  |
| Vector product definition | Correct definition (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Figure of vector product | Correctly showing both vectors and their product vector (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Explanation  | Correctly explaining above figure or physical significance or at least one correct example or any one of the characteristics (0.5) | Wrong answer (0) |  |  |  |
| 3(b) | Diagram | Correct Diagram (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Range | Correct definition and derivation of Range (1.5) | Partially correct response(1) | Some relevant information (0.5) | Wrong answer (0) |  |
| Time of Flight | Correct definition and derivation of Time of Flight (1.5) | Partially correct response(1) | Some relevant information (0.5) | Wrong answer (0) |  |
| 3 (c) | Dimensional proof of second equation of motion | Correct proof (4) | Partially correct proof (3) | Some Correct Mathematical Steps (2) | Some relevant information (1) | Wrong answer (0) |
|  4(a) | Statement of Bernoulli’s equation | Correct statement (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Diagram | Correct diagram (1) | Partially correct response (0.5) | Wrong answer (0) |  |  |
| Explanation of Bernoulli’s equation | Correct detailed explanation/ derivation (3) | Partially correct response (2) | Some Correct Mathematical Steps (1) |  |  |
| 4 (b) | Gravitational field as conservative field | Correct diagram (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Proving either work done by gravitational field along closed path is zero or work done by gravitational field is independent of the path followed (3) | Partially correct proof (2) | Some mathematical Steps (1) | Wrong answer (0) |  |
| 4 (c) | Condition | Correct Condition i.e R2=2R1 (1) | Wrong answer (0) |  |  |  |
| Formula | Correct Formula placement(1) | Partially correct (0.5) | Wrong answer (0) |  |
| Calculation  | Correct calculation (2) | Partially correct (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |
| 5 (a) | Diagram | Correct Diagram (1) | Partially correct (0.5) | Wrong answer (0) |  |  |
| Simple pendulum performs SHM | Correctly deriving for simple pendulum (a α -x) (2) | Partially correct derivation (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| Derivation of time period  | Correctly deriving the formula of time period (2) | Partially correct derivation (1) | Some Correct Mathematical Steps (0.5) | Wrong answer (0) |  |
| 5 (b) | Proof of speed of sound at any temperature | Correct proof (4) | Partially correct proof (3) | Some Correct Mathematical Steps (2) | Some relevant information (1) | Wrong answer (0) |
| 5 (c) | Derivation of Cp – Cv = R | Correct derivation (4) | Partially correct (3) | Some Correct Mathematical Steps (2) | Some relevant information (1) | Wrong answer (0) |



**MARKING SCHEME (OMR)PHYSICS – I(L)**

**HSSC 1stANNUAL EXAMINATION 2022**

**Section – A**

**Q 1: Circle the correct option i.e A/B/C/D. Each part carries one mark.**

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| **Version No.** | **3081** | **3082** | **3083** | **3084** |
| **1** | **B** | **B** | **B** | **B** |
| **2** | **C** | **C** | **D** | **C** |
| **3** | **B** | **D** | **D** | **A** |
| **4** | **B** | **C** | **A** | **A** |
| **5** | **D** | **C** | **D** | **B** |
| **6** | **A** | **A** | **D** | **A** |
| **7** | **D** | **B** | **B** | **A** |
| **8** | **D** | **A** | **C** | **D** |
| **9** | **B** | **A** | **B** | **D** |
| **10** | **C** | **C** | **B** | **C** |
| **11** | **B** | **B** | **D** | **C** |
| **12** | **D** | **C** | **A** | **A** |
| **13** | **C** | **A** | **D** | **B** |
| **14** | **A** | **D** | **B** | **A** |
| **15** | **C** | **B** | **A** | **C** |
| **16** | **D** | **D** | **C** | **B** |
| **17** | **B** | **A** | **A** | **D** |

 