

Total Marks: 40
Time Allowed: 1:40 Hours

Phy/Chem/Bio/CSC HSSC-1

To be filled-in by the Candidate

MCQs PAPER VERSION

A	B	C	D	E
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CORRECTLY FILLED



WRONG METHOD



Roll Number					

Question Booklet No.

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FILL ONLY ONE BUBBLE FOR EACH CORRECT ANSWER. USE BLACK BALL POINT/MARKER

FOLLOW THE CORRECT SEQUENCE TO FILL-IN THE BUBBLES

1	A	B	C	D	12	A	B	C	D	23	A	B	C	D	34	A	B	C	D	45	A	B	C	D
2	A	B	C	D	16	A	B	C	D	24	A	B	C	D	35	A	B	C	D	46	A	B	C	D
3	A	B	C	D	14	A	B	C	D	25	A	B	C	D	36	A	B	C	D	47	A	B	C	D
4	A	B	C	D	15	A	B	C	D	26	A	B	C	D	37	A	B	C	D	48	A	B	C	D
5	A	B	C	D	16	A	B	C	D	27	A	B	C	D	38	A	B	C	D	49	A	B	C	D
6	A	B	C	D	17	A	B	C	D	28	A	B	C	D	39	A	B	C	D	50	A	B	C	D
7	A	B	C	D	18	A	B	C	D	29	A	B	C	D	40	A	B	C	D	51	A	B	C	D
8	A	B	C	D	19	A	B	C	D	30	A	B	C	D	41	A	B	C	D	52	A	B	C	D
9	A	B	C	D	20	A	B	C	D	31	A	B	C	D	42	A	B	C	D	53	A	B	C	D
10	A	B	C	D	21	A	B	C	D	32	A	B	C	D	43	A	B	C	D	54	A	B	C	D
11	A	B	C	D	22	A	B	C	D	33	A	B	C	D	44	A	B	C	D	55	A	B	C	D
																			56	A	B	C	D	

FOLLOW THE CORRECT SEQUENCE TO FILL-IN THE BUBBLES (SCENARIO BASED MCQs)	57	A	B	C	D	61	A	B	C	D	65	A	B	C	D
	58	A	B	C	D	62	A	B	C	D	66	A	B	C	D
	59	A	B	C	D	63	A	B	C	D	67	A	B	C	D
	60	A	B	C	D	64	A	B	C	D	68	A	B	C	D
FOLLOW THE CORRECT SEQUENCE TO FILL-IN THE BUBBLES (SCENARIO BASED MCQs)	69	A	B	C	D	73	A	B	C	D	77	A	B	C	D
	70	A	B	C	D	74	A	B	C	D	78	A	B	C	D
	71	A	B	C	D	75	A	B	C	D	79	A	B	C	D
	72	A	B	C	D	76	A	B	C	D	80	A	B	C	D



Federal Board HSSC-I Examination
Physics Model Question Paper
National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

Section - A (Marks 40)

Time Allowed: 1 hr 40 minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/ overwriting is not allowed. Use a blue/black ballpoint pen to fill bubbles. Do not use lead pencil.

ROLL NUMBER					

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

Version No.			

0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

Candidate Sign. _____

Invigilator Sign. _____

Note: Fill the correct bubble for each question. Each question carries 0.5 mark.

Sr #	Question	(A)	(B)	(C)	(D)	A	B	C	D
1.	Which of the following is the derived unit of density in terms of SI base units?	m^2/kg	m^3/kg	kg/m^3	kg/m^2	☐	☐	☐	☐
2.	Students are dropping a ball from a height close to the ground to calculate the value of g. Students get slightly different values each time under similar conditions. This is because of:	lack of skills	uncertainty in measurements	temperature variation	variation in the value of g	☐	☐	☐	☐
3.	A physical quantity has dimensions $[MLT^{-2}]$. This corresponds to:	energy	force	pressure	power	☐	☐	☐	☐
4.	The direction of the vector $\vec{A} = 3\hat{i} + 4\hat{j}$ relative to the x-axis is approximately:	30°	37°	41°	53°	☐	☐	☐	☐
5.	A student calculates the kinetic energy K of a moving body using $K = \frac{1}{2}mv^2$. If both m and v contain individual percentage uncertainties of 5% respectively, what is the total percentage uncertainty in the calculated kinetic energy K?	5%	10%	15%	20%	☐	☐	☐	☐
6.	The homogeneity of the equation $s = ut + \frac{1}{2}at^2$ is checked by:	comparing numerical values only	comparing dimensions of variables	Analyzing coefficients of variables	plotting s versus t	☐	☐	☐	☐

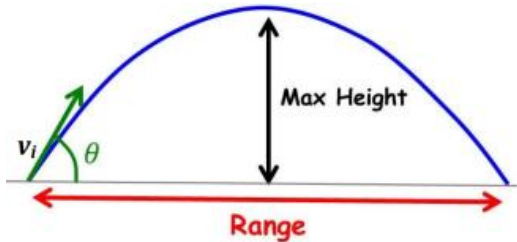
7.	A measurement, which on repetition gives same or nearly same results, is called:	accurate reading	average reading	precise reading	estimated reading	☐ ☐ ☐ ☐
8.	The fractional uncertainty in the given length $L \pm \Delta L = 2.0 \text{ m} \pm 0.1 \text{ m}$ is:	0.05	0.1	0.15	0.5	☐ ☐ ☐ ☐
9.	The equation $ \mathbf{A} \cdot \mathbf{B} = \mathbf{A} \times \mathbf{B} $ is consistent when angle between vectors $\mathbf{A}$ and $\mathbf{B}$ is:	30°	45°	60°	90°	☐ ☐ ☐ ☐
10.	In the presence of air resistance , how does the horizontal component of a projectile's velocity change during its flight?	remains constant	continuously decreases	continuously increases	decreases, then increases	☐ ☐ ☐ ☐
11.	Distance covered by a freely falling body in 2 seconds is:	4.9 m	19.6 m	39.2 m	44.1 m	☐ ☐ ☐ ☐
12.	Rod A has a length of $(12.0 \pm 0.2 \text{ cm})$ and rod B has a length of $(8.0 \pm 0.3 \text{ cm})$. Their combined length is given as:	$20.0 \pm 0.5 \text{ cm}$	$20.0 \pm 0.2 \text{ cm}$	$20.0 \pm 0.3 \text{ cm}$	$20.0 \pm 0.1 \text{ cm}$	☐ ☐ ☐ ☐
13.	Which of the following is the primary reason why friction is a non-conservative force?	It always does negative work	Its work depends on the path taken	It depends on the mass of the object	It acts only on moving objects	☐ ☐ ☐ ☐
14.	An object is dropped from a high cliff and experiences a constant air resistance force (f) during its fall. After falling through a vertical distance (h), its kinetic energy increases by (ΔK). Which equation represents the correct relationship between these variables?	$\Delta K = mgh$	$\Delta K = (mgh + fh)$	$\Delta K = (mgh - fh)$	$\Delta K = (fh - mgh)$	☐ ☐ ☐ ☐
15.	A cable has a cross-sectional area of 0.025 m^2 . Calculate the stress it experiences when supporting a load of $5 \times 10^5 \text{ N}$.	$2 \times 10^7 \text{ N/m}^2$	$2 \times 10^5 \text{ N/m}^2$	$2.5 \times 10^7 \text{ N/m}^2$	$2.5 \times 10^5 \text{ N/m}^2$	☐ ☐ ☐ ☐
16.	Two wires are identical having same length and same material. Wire A has twice the cross-sectional area of wire B. If same stretching force is applied to both wires, which statement correctly describes the deformation?	Wire A is stretched more	Wire B is stretched more	Both wires are stretched equally	Neither of the wires is stretched	☐ ☐ ☐ ☐
17.	Calculate the work done from the following force-	30 J	60 J	90 J	180 J	☐ ☐ ☐ ☐

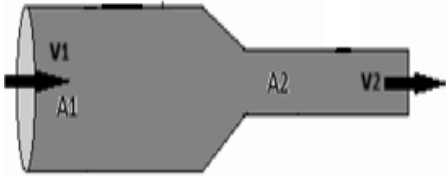
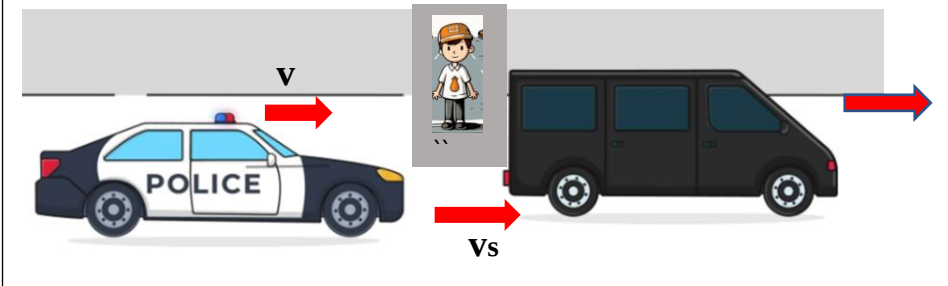
	displacement graph: 					
18.	In angular motion, the angles are expressed in radians because:	Radians are easier to measure	Radians being a ratio are more natural and consistent	Radians are smaller than degrees	Radians were used in ancient maths	☐ ☐ ☐ ☐
19.	Which statement is true about glassy solids?	they have regular geometric shapes	they lack translational symmetry	they are long range ordered materials	they have sharp melting point	☐ ☐ ☐ ☐
20.	The temperature of a solid copper block increases from 20°C to 30°C . What happens to the K.E. and P.E. of its particles?	K.E and P.E both increase	P.E decreases but K.E increases	K.E and P.E both decrease	P.E increases but K.E decreases	☐ ☐ ☐ ☐
21.	Which one is true about the work done by an ideal gas at constant pressure as shown by the graph? 	$W < 0$	$W = \infty$	$W > 0$	$W = 0$	☐ ☐ ☐ ☐
22.	A string is stretched by applying a force until it breaks. Which of the following statements justifies what the area under force-extension graph represents?	Stiffness of the string	Potential energy stored during deformation	Young's modulus	Extension in the string	☐ ☐ ☐ ☐
23.	A loud speaker emits sound waves with a power of 0.05 W . The intensity of sound falling at an area 50.24 m² will be:	$9.95 \times 10^{-3} \text{ W/m}^2$	$9.95 \times 10^{-4} \text{ W/m}^2$	$9.95 \times 10^{-5} \text{ W/m}^2$	$9.95 \times 10^{-6} \text{ W/m}^2$	☐ ☐ ☐ ☐
24.	While passing through a larger slit, diffraction of water waves will be:	less	most	more	negligible	☐ ☐ ☐ ☐
25.	Which of the following correctly pairs elastic deformation with plastic deformation ? (elastic; plastic)	Permanent; Temporary	Irreversible; Reversible	Long range; short range	Reversible; Irreversible	☐ ☐ ☐ ☐
26.	The Boltzmann constant k is given by the expression:	$\frac{R}{N_A}$	$\frac{N_A}{N}$	$\frac{N_A}{R}$	$\frac{N}{N_A}$	☐ ☐ ☐ ☐
27.	Which of the following waves lacks the phenomenon	Sound waves	Light waves	Radio waves	Microwaves	☐ ☐ ☐ ☐

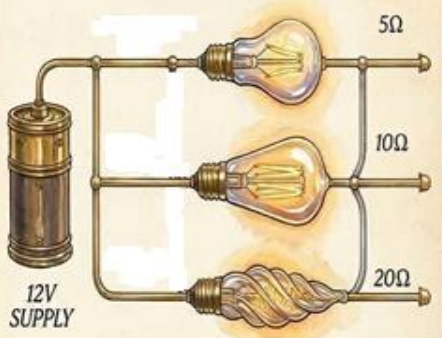
	of polarization?					
28.	Which statement best interprets the second law of thermodynamics?	Total energy of an isolated system remains constant	Total entropy of an isolated system always increases	Heat can flow from colder to hotter body at its own	Entropy of a perfect crystalline substance is zero at 0 Kelvin	☐ ☐ ☐ ☐
29.	Unit for the constant of proportionality k in Coulomb's law is:	Nm^2C^2	$Nm^{-2}C^{-2}$	Nm^2C^{-2}	$Nm^{-2}C^2$	☐ ☐ ☐ ☐
30.	The magnitude of electric field intensity 50 cm away from a 3μC charge is:	1.08×10^7 N/C	1.08×10^{-7} N/C	1.08×10^{-5} N/C	1.08×10^5 N/C	☐ ☐ ☐ ☐
31.	Which one of the following properties must be kept in mind while drawing electric field lines?	Field lines must always be drawn in circles.	Field lines can cross each other if the charges are large.	Field lines must never cross each other.	Field lines always point toward a positive charge.	☐ ☐ ☐ ☐
32.	A positive charge enters horizontally in a uniform electric field, directed vertically downward, due to oppositely charged parallel plates. In which direction will the charge be deflected?	Upward, towards the positive plate.	Downward, towards the negative plate.	In a straight line with no deflection.	In a circular path	☐ ☐ ☐ ☐
33.	The potential difference between the terminals of a battery is 9V . How much energy is required to transfer 10 C of charge across these terminals?	10.9 J	1.9 J	90 J	91 J	☐ ☐ ☐ ☐
34.	The galvanometer is mainly used in null method because:	It is sensitive to very small currents	It allows large currents to flow	It has negligible internal resistance	It measures high voltages directly	☐ ☐ ☐ ☐
35.	If the distance between two charged parallel plates is doubled while keeping the potential difference constant, the electric field strength will become:	Double of its original value	Half of its original value	Four times of its original value	unchanged	☐ ☐ ☐ ☐
36.	The working principle of a seismometer is based on:	electro statics	electro magnetic induction	magnetic attraction	electrical resistance	☐ ☐ ☐ ☐
37.	A square metallic plate of sides 10m is kept in a magnetic field which is making angle of 30° with the normal. The magnetic flux associated with it is 200Wb . What will be the intensity of magnetic field at the plate?	2.2 T	3.21 T	2.31 T	1.32 T	☐ ☐ ☐ ☐
38.	In a velocity selector, if the charged particle's velocity is	be stopped instantly	be deflected in the	be deflected in	move in a straight	☐ ☐ ☐ ☐

	less than E/B , the particle will:		direction of electric field.	the direction of magnetic field.	line.	
39.	A rod has a proper length of 10m . As it moves past a stationary observer at a speed of $0.6c$, its length is measured to be 8m by the observer. Why there is a change in the observed length?	The proper length is invariant	The atoms of rod physically shrink	Moving objects appear shorter in relative motion	Moving objects appear stretched in relative motion	☐ ☐ ☐ ☐
40.	During β^- decay, a neutron within a nucleus transforms into which of the following sets of particles?	Proton + electron + anti-neutrino	Proton + positron + neutrino	Electron + gamma rays	Neutron + proton	☐ ☐ ☐ ☐
41.	Which statement best compares a quark and an anti-quark of the same flavor?	Both have same electric charge but opposite masses	Both have opposite electric charges but same mass	Both have same charge and mass but different colors	They are identical in every way	☐ ☐ ☐ ☐
42.	Which elementary particle serves as the force carrier for the electromagnetic interactions?	Gluon	Photon	Z-Boson	W-boson	☐ ☐ ☐ ☐
43.	Alpha particles are emitted with discrete energies, whereas beta particles are emitted with a continuous range of energies because:	neutrino shares the energy in alpha decay	neutrino/anti-neutrino shares the energy in beta decay	anti-neutrino shares the energy in alpha decay	alpha particles are bosons	☐ ☐ ☐ ☐
44.	As an object's velocity approaches speed of light c , the relativistic mass will:	decrease	remain constant	increase	become zero	☐ ☐ ☐ ☐
45.	In electron-positron annihilation, why are at least two photons produced instead of just one?	To conserve electric charge	To conserve mass	To conserve linear momentum	To conserve lepton number	☐ ☐ ☐ ☐
46.	Both electrons and neutrinos are classified as leptons; because	They experience strong nuclear force	They do not experience strong nuclear force	They are made up of quarks	They are made up of anti-quarks	☐ ☐ ☐ ☐
47.	The speed of light in vacuum is:	Variable with observer's speed	Constant for all inertial frames	Greater for moving observer	Zero in non-inertial frames	☐ ☐ ☐ ☐
48.	Two events occur simultaneously at different locations in a stationary reference frame. According to special relativity, a moving observer will perceive them as:	occurring at the same time and same location	occurring at different times	occurring at the same time but at different locations	merging into a single event	☐ ☐ ☐ ☐

49.	Two systems (placed in contact with each other) are said to be in thermal equilibrium if:	they both have same mass.	no heat transfer between them.	they both have equal volume	they both are isolated from surroundings	☐ ☐ ☐ ☐
50.	An increase in entropy leads to the “Degradation of energy”; This is because:	Energy is lost permanently	Total energy of universe has decreased	Total energy of system has decreased	Less energy is available for useful work	☐ ☐ ☐ ☐
51.	A wire carries 3A current having cross- sectional area 10^{-6}m^2 and number of electrons per cubic meter $5\times 10^{28}\text{m}^{-3}$. Given that charge on a single electron is $1.6\times 10^{-19}\text{C}$, the drift velocity of electrons will be:	$3.75\times 10^{-4}\text{m/s}$	$2.75\times 10^{-4}\text{m/s}$	$1.75\times 10^{-4}\text{m/s}$	$0.75\times 10^{-4}\text{m/s}$	☐ ☐ ☐ ☐
52.	A coil of 20 turns experiences a change in magnetic flux from 0.01Wb to 0.05Wb in 2s . The induced emf in the coil is:	0.2V	0.4V	0.1V	0.5V	☐ ☐ ☐ ☐
53.	If the speed of light c is the only absolute quantity in universe then space and time must;	entirely disappear	also be absolute	be finite	depend on observer's frame of reference	☐ ☐ ☐ ☐
54.	Which real-world phenomenon provides evidence for time dilation?	Expansion of metals when heated	Life spans of cosmic-ray muons reaching the earth's surface	Sound echoes in valleys	Red shift of distant galaxies	☐ ☐ ☐ ☐
55.	A skater is spinning rapidly on ice with angular speed ($\omega_1 = 5\text{rad/s}$) having her arms tucked. Her initial moment of inertia is ($I_1 = 2\text{kgm}^2$). If she suddenly extends her arms outward, her moment of inertia becomes ($I_2 = 5\text{kgm}^2$). What will be her new angular speed ω_2 ?	0.2 rad/s	5 rad/s	2 rad/s	0.5 rad/s	☐ ☐ ☐ ☐
56.	A centripetal force is a force required to change a body's:	Mass	Speed	K.E.	Direction of motion	☐ ☐ ☐ ☐

STIMULUS/SITUATION/SCENARIO BASED MCQs						
Scenario for MCQs # 57 to 60		A projectile is launched with an initial speed of 200 m/s at an angle of 30° with the horizontal. 				
57.	Determine the time of flight of the projectile.	10.41 s	20.41 s	30.52 s	0.41 s	☐ ☐ ☐ ☐
58.	Find the peak height of the projectile.	210.2 m	310.2 m	410.2 m	510.2 m	☐ ☐ ☐ ☐
59.	Calculate the maximum horizontal displacement of the projectile.	2534.7 m	3534.7 m	4534.7 m	5534.7 m	☐ ☐ ☐ ☐
60.	Find the time for projectile to reach its maximum height.	10.20 s	20.41 s	30.52 s	0.41 s	☐ ☐ ☐ ☐
Scenario for MCQs # 61 to 64		A city installs a giant Ferris wheel of 1m radius in a new amusement park. The wheel starts from rest and is uniformly accelerated by an electric motor until it reaches its full operating speed. The time to complete one revolution is 20 seconds. 				
61.	The angular velocity of the wheel will be expressed as:	$\frac{2\pi}{T}$	$\frac{T}{2\pi}$	$\frac{2\pi}{v}$	$\frac{2\pi}{f}$	☐ ☐ ☐ ☐
62.	If the wheel turns through an angle $\theta = 2\text{rad}$, what is the tangential distance covered by it?	2 m	1 m	0.2 m	0.1m	☐ ☐ ☐ ☐
63.	A boy sitting in the wheel moves at a constant speed along a curved path. What can be concluded about the net force acting on the boy?	it is zero.	it is perpendicular to the direction of motion of boy.	it is parallel to the direction of motion of boy.	it is opposite to direction of motion of boy.	☐ ☐ ☐ ☐
64.	During first 10 seconds from rest, the wheel covers an angular displacement of 50 radians. What will be the angular acceleration of the wheel?	0.1 rad/s ²	1.0 rad/s ²	1.7 rad/s ²	1.5 rad/s ²	☐ ☐ ☐ ☐

Scenario for MCQs # 65 to 68		A horizontal ventilation duct points smoothly from a wide inlet ($A_1 = 0.08\text{m}^2$) to a narrow nozzle ($A_2 = 0.02\text{m}^2$). Air flows continuously through the system, behaving as an ideal, incompressible fluid under steady-state conditions. 				
65.	The equation of continuity ($A_1v_1 = A_2v_2$) used to analyze this system is a statement of;	Law of conservation of mass	Law of conservation of energy	Law of conservation of momentum	Law of conservation of charge	☐ ☐ ☐ ☐
66.	How the flow rate of air passing through the wide inlet (A_1) can be compared to that passing through the narrow nozzle (A_2)?	It is greater at A_1	It is greater at A_2	It is equal in both parts	It is zero at A_1 and non-zero at A_2	☐ ☐ ☐ ☐
67.	As air moves from the wide pipe into the narrow nozzle, its internal pressure decreases. This is because:	Nozzle exerts extra force on air	The speed of air increases and its P.E decreases	K.E of molecules decreases due to friction	Density of air increases	☐ ☐ ☐ ☐
68.	If the air moves at 3 m/s in the wide inlet (A_1), what will be its speed when it will exit the narrow nozzle (A_2)?	1.2 m/s	120 m/s	0.12 m/s	12 m/s	☐ ☐ ☐ ☐
Scenario for MCQs # 69 to 72		A police car is chasing 40 m/s a speedy car on a straight highway. The siren of police car is blaring at a constant frequency (f) of 600 Hz. The speedy car ahead is moving at a speed of 50 m/s (Speed of sound in air is $v = 340$ m/s). 				
69.	The frequency of the siren heard by the speeding car driver will be:	lower	higher	same	medium	☐ ☐ ☐ ☐
70.	The frequency of siren heard by the officer in police car is:	Greater than 600 Hz	Lower than 600 Hz	Exactly 600 Hz	Any value from 700 Hz to 1200 Hz	☐ ☐ ☐ ☐
71.	A person standing stationary by the road side, hears the siren as police car approaches. The frequency f' heard by this stationary person will be:	680 Hz	529 Hz	670 Hz	536 Hz	☐ ☐ ☐ ☐

72.	If the speedy car slows down and matches the police car's speed (both at 40 m/s), the frequency of sound observed by the speedy car's driver will be:	Same as original frequency of sound	Greater than original frequency of sound	Smaller than original frequency of sound	Speed of sound will decrease.	☐ ☐ ☐ ☐		
Scenario for MCQs # 73 to 76		An electrician designs a lighting circuit using three lamps with resistances 5 Ω, 10 Ω, and 20 Ω connected to a 12 V supply. He compares properties of series and parallel connections.						
		THE SERIES CONNECTION (R_{total})  12V SUPPLY 5Ω RESISTANCE 10Ω RESISTANCE 20Ω RESISTANCE THE PARALLEL CONNECTION (R_{total})  12V SUPPLY 5Ω 10Ω 20Ω						
		73.	In the series connection, if the current drawn is 0.34A , what is the voltage drop across the 10 Ω lamp?	34 V	29.4 V	3.4 V	2.94 V	☐ ☐ ☐ ☐
		74.	Which lamp will be the brightest in the parallel connection?	The 5 Ω lamp	The 10 Ω lamp	The 20 Ω lamp	All lamps will have the exact same brightness.	☐ ☐ ☐ ☐
		75.	What is the total resistance of the series connection?	30 Ω	15 Ω	20 Ω	35 Ω	☐ ☐ ☐ ☐
76.	After comparison, he prefers the Parallel connection over Series combination of bulbs. This is because in parallel circuit,	He uses less number of wires.	each lamp operates independently and receives full voltage.	the total current is reduced	the bulbs are safe from ever burning out.	☐ ☐ ☐ ☐		
Scenario for MCQs # 77 to 80		Inside a “high-velocity” research chamber, physicists observe two different subatomic interactions. They note the following:						
		System		Interaction Mechanism				
		Quarks bound inside a proton		Exchange of gluons				
		Electrons in the beam		Exchange of photons				
77.	Which fundamental force is responsible for the exchange of gluons between quarks?	Electro-magnetic force	Weak nuclear force	Strong force	Gravitational force	☐ ☐ ☐ ☐		
78.	The exchange of photons between electrons mediates which type of interaction?	Strong interaction	Electromagnetic interaction	Gravitational interaction	Beta decay interaction	☐ ☐ ☐ ☐		
79.	In particle physics, gluons and photons both are called force-carrying particles. They are generally categorized as:	Leptons	Hadrons	Gauge-Bosons	Fermions	☐ ☐ ☐ ☐		

80.	Why do quarks exchange gluons whereas electrons do not?	electrons are negatively charged particles and repel gluons	Gluons only interact with particles having color and quarks possess color charge	Gluons decay before reaching electrons	Gluons only interact with leptons	
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Federal Board HSSC-I Examination

Physics Model Question Paper

National Curriculum 2022-2023 (Inclusive Scheme of Studies 2024)
(50% MCQs & 50% Descriptive)

Time allowed: 1 hour 20 minutes

Total Marks: 40

Note: Answer all parts from Section 'B' and all questions from Section 'C' on the **E-sheet**. Write your answers on the allotted/given spaces.

SECTION – B (7×4 = 28 Marks)

Note: Give brief answers of the following questions. All questions carry equal marks. (7×4 = 28)

Q #	Question	Marks	Question	Marks
1	Using commutative property, distinguish between scalar product and vector product of two vectors. Give mathematical justifications for both.	2+2	OR Distinguish between inertial and non-inertial frames of reference. Providing at least one example for each.	3+1
2	An aero plane while flying horizontally drops a bomb when reaches exactly above the target but misses it. Explain why?	04	OR Explain how inspectors can easily check the reliability of a concrete bridge with carbon fibers?	04
3	Enlist the assumptions made about an ideal fluid.	04	OR What do you mean by conservative and non-conservative forces? Give two examples of each.	2+2
4	A device draws a current of 4A when connected to a 12V battery. Calculate the: a) power consumed by the device. b) resistance of the device.	2+2	OR A straight wire of length 0.75m carries a current of 8A . It is placed in a uniform magnetic field of 0.2T such that it makes an angle of 45° with the magnetic field lines. (a) Determine the magnitude of the magnetic force on the wire. (b) What would be the force if the wire were placed parallel to the magnetic field?	3+1
5	How beats are produced? Why sometimes beats are not heard as distinct sounds by the human ear?	2 + 2	OR In what ways a refrigerator operates as a heat engine working in reverse? Draw block diagram to show the direction of heat flow and work done.	3+1
6	A metal mesh enclosure blocks external electric charges from affecting a person inside. What physical principle explains this effect and how?	1+3	OR Explain how the path difference between two coherent waves determines whether they produce a bright or dark interference pattern.	2+2
7	Define baryons and mesons. Give two examples of each.	2+2	OR What is drag force? Mention three factors upon which it depends?	1+3

SECTION–C (Marks 2 x 6 = 12)

8	Draw PV diagram for Carnot cycle. Discuss four processes involved in it using the diagram.	2+ 4	OR	Illustrate that frequencies of stationary waves in a stretched string are quantized. Also discuss the physical significance of quantization in this situation.	4+2
9	State why the magnetic field due to a current- carrying solenoid is increased when a ferrous core (iron) is inserted into it? Explain the significance of relative permeability of iron core in this regard?	4+2	OR	What is moment of inertia? State and explain law of conservation of angular momentum.	2+1 +3