Rubrics: SSC 1st ANNUAL EXAMINATION 2024
Subject: PHYSICS-SSC-II (B)

Q No/ Part No	Criteria	LEVEL 1 (Marks)	LEVEL 2 (Marks)	LEVEL 3 (Marks)	LEVEL 4 (Marks)	LEVEL 5 (Marks)
2(i)	Comparing the time period of pendulum in Islamabad and Mount Everest	Correctly comparing that time period is greater at Mount Everest than at Islamabad due to small value of "g" and vice versa with the help of formula of time period (03)	Correctly mentioning that time period is greater at Mount Everest than at Islamabad due to small value of "g" and vice versa without writing formula of time period (02)	Any relevant information (01)	Wrong (0)	
OR 2(i)	Enlisting the necessary conditions to produce echo	Correctly describing the two conditions i.e. reflected sound should be heard after 0.1 second and minimum distance between sound and obstacle in air should be at least 17m in air.(03)	Correctly describing any one condition mentioned in level-1 (02)	Some relevant information (01)	Wrong (0)	
2(ii)	Describing factors affecting the loudness of sound	Correctly describing any three factors (03)	Correctly describing any two factors (02)	Correctly describing any one factor (01)	Wrong (0)	
OR 2(ii)	Describing damping phenomenon	Correctly describing or defining damping (01)	Some relevant information (0.5)	Wrong (0)		
	Discussion on damping graph	Correctly drawing graph between instantaneous displacement of vibrating	Correctly drawing graph only OR correct brief description OR some	Wrong (0)		

		body & time and correct brief description (02)	relevant information (01)			
2 (iii)	Finding speed of light in diamond of refractive index 2.42	Correctly calculating the speed of light by using formula n=c/v i.e. 1.24 x 10^8 m/s (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2 (iii)	Definition of mutual induction	Correct definition (01)	Partially correct (0.5)	Wrong (0)		
	Schematic diagram of Mutual induction	Correctly labelled diagram (01)	Partially correct (0.5)	Wrong (0)		
	Unit of mutual induction	Correctly written unit i.e. henry (01)	Wrong (0)			
2 (iv)	Finding magnitude of force between the metallic charged spheres	Correctly calculating the magnitude of force i.e. 140.6 N (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2 (iv)	Power delivered to air conditioner	Correctly calculating the power i.e. 2520W or 2.52kW (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
2 (v)	Calculating angle of refraction in glass	Correct calculation of angle of refraction of glass using Snell's law i.e. 21.7 degrees or 22 degrees 03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2 (v)	Calculation of current flowing through the bulb	Correctly calculating the total voltage of eight cells i.e. 8x1.5=12V and	Any one of the two steps covered in the calculation (02)	Some relevant mathematical step (01)	Wrong (0)	

		calculating the current i.e. 1.2A (03)				
2 (vi)	Calculation of electrical energy consumed in electric heater	Correct calculation of electric energy i.e. 3.8 x 10^7 J (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2 (vi)	Writing equation of alpha decay for Radium-226	Correctly writing the equation i.e. $^{226}_{88}Ra \rightarrow$ $^{222}_{86}Rn + ^{4}_{2}He$ (02)	Partially correct (01)	Wrong (0)		
	Identifying the daughter element	Correctly identifying the daughter element i.e. Radon $^{222}_{86}Rn$ (01) (Give the marks if Radon is written in the equation correctly)	Partially correct (0.5)	Wrong (0)		
2 (vii)	Briefly explaining the Right Hand Rule when the current passing through a solenoid.	Correctly stating the rule "Curl the fingers in the direction of current around the coil or solenoid and the extended thumb will point in the direction of north pole of magnet." (03)	Partially correct (02)	Some relevant information (01)	Wrong (0)	
OR 2 (vii)	Discuss/Define NOR gate	Correctly defining NOR gate (01)	Some relevant information (0.5)	Wrong (0)		
	Circuit diagram of NOR	Correct circuit diagram	Correct circuit diagram	Wrong (0)		

	gate and symbol	and correct symbol (01)	or correct symbol (0.5)			
	Truth table of NOR gate	Correct truth table (01)	Partially Correct (0.5)	Wrong (0)		
2 (viii)	Briefly elaborate the methods to increase the resultant force on armature of DC motor	Correctly describing any three methods i.e. by increasing current, increasing length of conductors of the coil and strength of external magnetic field {F=ILB} (03)	Any two correct methods mentioned in level-1 (02)	Any one correct method mentioned in level-1 (01)	Wrong (0)	
OR 2 (viii)	Comparison between RAM and ROM	Correctly writing any three correct differences (03)	Correctly writing any two correct differences (02)	Correctly writing any one correct difference (01)	Wrong (0)	
2(ix)	Finding the value of resistance use in circuit having battery 24v and current passes through the resistor is 30 mA	Correctly calculating the resistance i.e 800 ohm (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2 (ix)	State Right Hand Rule for current passing through a conductor placed inside a uniform magnetic field	Correctly stating the rule "Point your fingers in the direction of magnetic field and thumb in direction of current. The palm of right hand gives the direction of force" (03)	Partially correct (02)	Some relevant information (01)	Wrong (0)	
2 (x)	Explaining the transmission of signal through optical fiber	Correctly explaining the transmission of light signals through optical fiber from its core to cladding having angle of	Correct explanation without diagram (02)	Some relevant information (01)	Wrong (0)	

		incidence greater than critical angle of the core and then having multiple reflections at core-cladding interface (phenomenon of total internal reflection). Also draw diagram (03)				
OR 2 (x)	Differentiate between analogue and digital electronics	Correctly writing any three correct differences (03)	Correctly writing any two correct differences (02)	Correctly writing any one correct difference (01)	Wrong (0)	
2 (xi)	Finding atomic mass number and atomic number of the daughter nucleus after beta emission from Thorium-234	Correctly finding atomic mass number i.e. 234 and atomic number i.e. 91 of the daughter nuclear after beta emission from Thorium-234 (02)	Partially correct (01)	Wrong (0)		
	Identifying the daughter nucleus	Correctly writing the name of the daughter nucleus i.e. Protactinium {Pa} (01)	Wrong (0)			
OR 2 (xi)	Finding the force between the nitrogen nucleus and valence electron	Correctly calculating the magnitude of force i.e. 7.2 x10^{-11} N (03)	Partially correct calculation e.g calculating force only using charge of nitrogen nucleus 7 instead of 7e or correct calculation but wrong answer etc. (02)	Some relevant mathematical step (01)	Wrong (0)	
Q. 3	Showing that simple pendulum performs SHM	Correctly describing that acceleration of vibrating simple pendulum is directly proportional to displacement from mean	Correct description without figure (02)	Some relevant information (01)	Wrong (0)	

		position mathematically or theoretically with the help of diagram (03)				
	Formula for time period of simple pendulum	Finding the correct formula (01)	Partially correct (0.5)	Wrong (0)		
	Formula for frequency of simple pendulum	Finding the correct formula (01)	Partially correct (0.5)	Wrong (0)		
OR Q. 3	Explanation of force on current carrying conductor in unform magnetic field	Correctly explaining the reason of force acting on the conductor and discussing any three factors affecting it (03)	Partially correct i.e. correct explanation of application of force on conductor or only describing any two factors affecting it (02)	Some relevant information (01)	Wrong (0)	
	Diagram for force acting on current carrying conductor placed in magnetic field	Correctly labelled diagram (02)	Partially correct (01)	Wrong (0)		
Q. 4	Explanation of parallel combination of capacitors	Correctly defining the parallel combination (01)	Partially correct (0.5)	Wrong (0)		
	Figure for parallel combination of capacitors	Correct labelled diagram (01)	Partially correct (0.5)	Wrong (0)		
	Writing characteristics of parallel combination of capacitor	Writing any one characteristic i.e. voltage remains the same across all capacitors or charge is different on different capacitors with mathematical equation (01)	Partially correct (0.5)	Wrong (0)		

Q	Aspect	Level 1	Level 2	Level 3	Level 4	Level 5
	Finding relation for equivalent capacitance	**Deriving the formula for equivalent capacitance of the parallel combination (02)**	**Partially correct (01)**	**Wrong (0)**		
OR Q. 4	**Data**	**Correct data (01)**	**Partially correct (0.5)**	**Wrong (0)**		
	Calculation	**Correct calculation with correct answer (04)**	**Correct calculation but answer without SI unit (03)**	**Some correct mathematical steps (02)**	**Some relevant information (01)**	**Wrong (0)**
Q. 5	**Elaborating the working of compound microscope**	**Correctly explaining the working of compound microscope (02)**	**Partially correct (01)**	**Wrong (0)**		
	Ray diagram of compound microscope	**Correct ray diagram (02)**	**Partially correct (01)**	**Wrong (0)**		
	Determining the magnifying power of compound microscope	**Writing correct formula for the magnifying power of compound microscope (01)**	**Partially correct (0.5)**	**Wrong (0)**		
OR Q. 5	**Use of logic gates in email login**	**Correct description with truth table and circuit diagram (2.5)**	**Correct description with either truth table or circuit diagram (02)**	**Only correct circuit diagram or correct truth table (1.5)**	**Some relevant information (01)**	**Wrong (0)**
	Use of logic gates in front and back door bell	**Correct description with truth table and circuit diagram (2.5)**	**Correct description with either truth table or circuit diagram (02)**	**Only correct circuit diagram or correct truth table (1.5)**	**Some relevant information (01)**	**Wrong (0)**
Q.6	**Explanation of nuclear fission reaction**	**Correct explanation of nuclear fission involving definition, example etc. (03)**	**Partially correct explanation involving any one step mentioned in level-1 (02)**	**Some relevant information (01)**	**Wrong(0)**	

		Diagram of nuclear fission	Correct labelled diagram (01)	Partially correct (0.5)	Wrong (0)		
		Equation for nuclear fission	Correct equation for fission reaction (01)	Partially correct (0.5)	Wrong (0)		
OR Q. 6		Differentiating between primary and secondary memories	Any three correct differences (2.5)	Any two correct differences (02)	Any one correct difference (1.5)	Some relevant information (01)	Wrong (0)
		Explaining the need of these memories in computers	Any three factors (2.5)	Any two correct factors (02)	Any one correct factor (1.5)	Some relevant information (01)	Wrong (0)

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

Rubrics: SSC 1st ANNUAL EXAMINATION 2024
Subject: PHYSICS SSC-II (D)

Q No/Part No	Criteria	LEVEL 1 (Marks)	LEVEL 2 (Marks)	LEVEL 3 (Marks)	LEVEL 4 (Marks)	LEVEL 5 (Marks)
2(i)	Calculating the time period of simple pendulum if its length is doubled	Correctly calculating that time period of simple pendulum will become $T' = \sqrt{2}T$ by using its formula. (03)	Partially Correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	
OR 2(i)	Describing factors affecting the magnitude of induced emf	Correctly describing at least three factors e.g. rate of change of magnetic flux through a coil, number of turns, relative velocity between coil and magnet etc. (03)	Correctly describing any two factors mentioned in level-1 (02)	Correctly describing any one factor mentioned in level-1 (01)	Wrong (0)	
2(ii)	Differentiate between loudness and pitch of sound	Correctly writing any three correct differences (03)	Correctly writing any two correct differences (02)	Correctly writing any one correct difference (01)	Wrong (0)	
OR 2(ii)	Comparison between RAM and ROM	Correctly writing any three correct differences (03)	Correctly writing any two correct differences (02)	Correctly writing any one correct difference (01)	Wrong (0)	
2 (iii)	Finding speed of light in glass of refractive index 1.5?	Correctly calculating the speed of light by using formula v=c/n i.e. 2 x 10^8 m/s (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)	

OR 2 (iii)	State Right Hand Rule for current passing through a conductor placed inside a uniform magnetic field	Correctly stating the rule "Point your fingers in the direction of magnetic field and thumb in direction of current. The palm of right hand gives the direction of force" (03)	Partially correct (02)	Some relevant information (01)	Wrong (0)
2 (iv)	Finding magnitude of force between the metallic charged spheres	Correctly calculating the magnitude of force i.e. 455N (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)
OR 2 (iv)	Calculation of electrical energy consumed in electric geyser	Correct calculation electric energy i.e. 3.45×10^7 J (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)
2 (v)	Calculating the refractive index	Correctly calculating the refractive index of water using Snell's law or n= $\sin\theta i/\sin\theta r$ i.e. n= 1.856 (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)
OR 2 (v)	Calculation of current flowing through the bulb	Correctly calculating the total voltage of four cells i.e. 4x1.5=6V and calculating the current i.e. 0.3A (03)	Any one of the two steps covered in the calculation (02)	Some relevant mathematical step (01)	Wrong (0)
2 (vi)	Power delivered to electric iron	Correctly calculating the power i.e. 1200W or 1.2kW (03)	Partially correct calculation (02)	Some relevant mathematical step (01)	Wrong (0)

OR 2 (vi)	Writing equation of beta decay for Co-60	Correctly writing the equation i.e. $^{60}_{27}Co \rightarrow$ $^{61}_{28}Ni + ^{0}_{-1}e$ (02)	Partially correct (01)	Wrong (0)	
	Identifying the daughter element	Correctly identifying the daughter element i.e. Nickle (01) (Give the marks if Nickle $^{61}_{28}Ni$ is written in the equation correctly)	Partially correct (0.5)	Wrong (0)	
2 (vii)	Briefly explaining the Right Hand Rule when the current passing through a solenoid.	Correctly stating the rule "Curl the fingers in the direction of current around the coil or solenoid and the extended thumb will point in the direction of north pole of magnet." (03)	Partially correct (02)	Some relevant information (01)	Wrong (0)
OR 2 (vii)	Finding the value of resistance used in circuit connect to 12 V battery and current passing through it is 1A	Correctly calculating the resistance using ohm's law $R = V/I$ i.e. 12ohm (03)	Partially correct (02)	Some relevant mathematical steps (01)	Wrong (0)
2 (viii)	Explaining the deflection of electron in an electric field	Correctly explaining the deflection of electron in the electric field due to action of electric force e.g. electron is deflected towards the positively charged plate or deflected away from negatively charged plates or any other correct explanation (02)	Partially correct (01)	Wrong (0)	

		Showing by diagram	Correct labelled diagram (01)	Partially correct (0.5)	Wrong (0)		
OR 2 (viii)		Definition of mutual induction	Correct definition (01)	Partially correct (0.5)	Wrong (0)		
		Schematic diagram of Mutual induction	Correctly labelled diagram (01)	Partially correct (0.5)	Wrong (0)		
		Unit of mutual induction	Correctly written unit i.e. henry (01)	Wrong (0)			
2(ix)		Discuss/Define AND gate	Correctly defining AND gate (01)	Some relevant information (0.5)	Wrong (0)		
		Circuit diagram of AND gate and symbol	Correct circuit diagram and correct symbol (01)	Correct circuit diagram or correct symbol (0.5)	Wrong (0)		
		Truth table of AND gate	Correct truth table (01)	Partially Correct (0.5)	Wrong (0)		
OR 2 (ix)		Explaining the function of shock absorber	Correct explanation on the basis of damped oscillation e.g. briefly explained the use of damping in the spring of shock absorbing and dissipation of the energy by it (03)	Partially correct (02)	Some relevant information (01)	Wrong (0)	
2 (x)		Differentiate between Hardware and Software	Correctly writing any three correct differences (03)	Correctly writing any two correct differences (02)	Correctly writing any one correct differences (01)	Wrong (0)	

OR 2 (x)	Differentiate between Loudness and Intensity of sound	Correctly write any three correct differences (03)	Correctly write any two correct differences (02)	Correctly write any one correct difference (01)	Wrong (0)
2 (xi)	Finding atomic mass number and atomic number of the daughter nucleus after alpha emission from Uranium-238	Correctly finding atomic mass number i.e. 234 and atomic number i.e. 90 of the daughter nuclear after alpha emission from Uranium-238 (02)	Partially correct (01)	Wrong (0)	
	Identifying the daughter nucleus	Correctly writing the name of the daughter nucleus i.e. Protactinium {Pa} (01)	Wrong (0)		
OR 2 (xi)	Finding the force between the carbon nucleus and valence electron	Correctly calculating the magnitude of force i.e. 3.375×10^{-11} N (03)	Partially correct calculation e.g calculating force only using charge of carbon nucleus 6 instead of 6e or correct calculation but wrong answer etc. (02)	Some relevant mathematical step (01)	Wrong (0)
Q. 3	Showing that mass spring system performs SHM	Correctly describing that acceleration of vibrating mass attached to spring is directly proportional to displacement from mean position mathematically or theoretically with the help of diagram (03)	Correct description without figure (02)	Some relevant information (01)	Wrong (0)
	Formula for time period of mass spring system	Finding the correct formula (01)	Partially correct (0.5)	Wrong (0)	
	Formula for frequency of mass spring system	Finding the correct formula (01)	Partially correct (0.5)	Wrong (0)	

OR Q. 3	**Elaborating the working of refracting telescope**	**Correctly explaining the working of refracting telescope (02)**	**Partially correct (01)**	**Wrong (0)**		
	Ray diagram of refracting telescope	**Correct ray diagram (02)**	**Partially correct (01)**	**Wrong (0)**		
	Determining the magnifying power of refracting telescope	**Writing correct formula for the magnifying power of refracting telescope (01)**	**Partially correct (0.5)**	**Wrong (0)**		
Q. 4	**Explanation of series combination of capacitors**	**Correctly defining the series combination (01)**	**Partially correct (0.5)**	**Wrong (0)**		
	Figure for series combination of capacitors	**Correct labelled diagram (01)**	**Partially correct (0.5)**	**Wrong (0)**		
	Writing characteristics of series combination of capacitor	**Writing any one characteristic i.e. charge remains the same across all capacitors or voltage is different on different capacitors with mathematical equation (01)**	**Partially correct (0.5)**	**Wrong (0)**		
	Finding relation for equivalent capacitance	**Deriving the formula for equivalent capacitance of the series combination (02)**	**Partially correct (01)**	**Wrong (0)**		
OR Q. 4	**Data**	**Correct data (01)**	**Partially correct (0.5)**	**Wrong (0)**		
	Calculation	**Correct calculation with correct answer i.e. 6432.5m or 6.43km (04)**	**Correct calculation but answer without SI unit (03)**	**Some correct mathematical steps (02)**	**Some relevant information (01)**	**Wrong (0)**
Q.5	**Explanation of torque on current carrying coil**	**Correctly explaining the reason of torque acting on**	**Partially correct i.e. correct explanation of**	**Some relevant information**	**Wrong (0)**	

	in unform magnetic field	the coil and discussing any three factors affecting it (03)	application of torque on the coil or only describing any two factors affecting it (02)	(01)		
	Diagram for torque acting on current carrying coil placed in magnetic field	Correctly labelled diagram (02)	Partially correct (01)	Wrong (0)		
OR Q. 5	Describing word processing	Correctly defining the word processing e.g. A program you can use to write letters on your computer is a type of software e.g. MS Word etc. (01)	Partially correct (0.5)	Wrong (0)		
	Characteristics of word processing	Correctly writing at least two characteristics e.g. Word processing is a computer program. Using this program we can develop any document, see it on the screen after typing. We can edit the document, add some new text or delete the previous text or make amendments in it. We can move text from one page to another, even from one document to another etc. (1.5)	Partially correct (01)	Some relevant information (0.5)	Wrong (0)	
	Describing data processing	Correctly defining the data processing e.g To collect all information regarding a	Partially correct (0.5)	Wrong (0)		

		subject for any purpose and to store them in the computer in more than one inter linkec files which may help when needed, is called 'data managing'.etc, (01)				
	Characteristics of data processing	Correctly writing at least two characteristics e.g. The educational institutions, libraries, hospitals and industries store the concerned information by data management. Additions and deletions are made in the data according to the requirement, which help in the improvement of the management of the institutions etc. (1.5)	Partially correct (01)	Some relevant information (0.5)	Wrong (0)	
Q. 6	Definition of half life	Correct definition (01)	Partially correct (0.5)	Wrong (0)		
	Deriving the formula for undecayed atoms	Correctly derived formula for undecayed atoms i.e. $N = No (1/2)^n$ labelled diagram (02)	Partially correct i.e. at least two correct mathematical steps (1.5)	at least one correct mathematical step (01)	Some relevant information (0.5)	Wrong (0)
	Graph between decaying atoms and time	Correct labelled graph (02)	Partially correct (01)	Wrong (0)		
OR Q. 6	Defining Cathode Ray Oscilloscope	Correct definition (01)	Partially correct (0.5)	Wrong (0)		
	Discuss working	Correct working principle	Correct working	Partially	Wrong (0)	

	principle with diagram of Cathode Ray Oscilloscope	and correct labeled diagram (02)	principle or correct labeled diagram (01)	correct (0.5)		
	Writing uses of Cathode Ray Oscilloscope	Writing correct any two uses (02)	Writing correct any one use (01)	Some relevant information (0.5)	Wrong (0)	

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