Academic Year العام الدراسي	2023/2024
Term الفصل	2
Subject المادة	Physics/Bridge الفيزياء/ بريدج
Grade الصف	12
Stream المسار	Advanced المتقدم
Number of Questions عدد الأسئلة	SWIFT 15 Paper Part 4
Type of All Questions نوع كافة الأسئلة	SWIFT: MCQ Paper Part: FRQ
Maximum Overall Grade الدرجة القصوى الممكنة	100
Mode of Implementation - طريقة التطبيق	SwiftAssess & Paper-Based
Calculator الآلة الحاسبة	Allowed مسموحة
Exam Duration - مدة الامتحان	150 minutes

Part الجزء	Question السؤال	Learning Outcome* ناتج التعلم*	Reference(s) in the Student Book / المرجع في كتاب الطالب Example/Exercise مثال/تمرين	Page الصفحة
SWIFT	1	Show that by definition the electric current is related to net charge through the equation between current and charge related to time .... Apply the relations to calcuate electric current at a point and the (i=dq/dt) net amount of charge passing a given point in time t.	As mentioned in the textbook	117
SWIFT	2	Define the current density J as the current per unit area flowing through a conductor.	As mentioned in the textbook	119
SWIFT	3	Apply the equation (R=ρL/A) in solving problems to calculate an unknown quantity given the other quantities. Analyse the equation (R=ρL/A)	As mentioned in the textbook	121-123
SWIFT	4	Calculate the equivalent resistance for resistors connected in series as the sum of their individual resistances. Recall and apply Ohm's Law (i=ΔV/R).	As mentioned in FIGURE 5.12	127- 128
SWIFT	5	Calculate the equivalent resistance for resistors in parallel arrangements (1/Req=1/R1+1/R2+..).	As mentioned in Concept Check 5.6	130- 133
SWIFT	6	Apply the equations of power (P=iΔV) for any electric device and $P = i^2 R = \frac{(\Delta V)^2}{R}$ for a resistor to solve numerical problems.	As mentioned in EXAMPLE 5.5	134
SWIFT	7	State Kirchhoff's junction rule: "The sum of the currents entering a junction must equal the sum of the currents leaving the junction" Calculate the equivalent resistance for resistors in parallel arrangements (1/Req=1/R1+1/R2+..).	As mentioned in Concept Check 6.1	146-147
SWIFT	8	Recall that in a single loop circuit, the current is the same everywhere in the circuit Analyze single loop circuits containing two sources of emf and circuit elements	As mentioned in FIGURE 6.8	148-149
SWIFT	9	Recall that an ammeter is a device used to measure current and voltmeter is a device used to measure potential difference Recall that an ammeter is wired in a circuit in series Recall that a voltmeter is wired in parallel with the component across which the potential difference is to be measured Identify that ammeters are designed to have as low resistance as possible, so they do not have an appreciable effect on the currents they measure Identify that voltmeters are designed to have as high resistance as possible, so they have a negligible effect on the potential differences the ymeasure	As mentioned in FIGURE 6.8	148-149
SWIFT	10	Apply the relationship giving the charge as a function of time for a capacitor in a charging RC circuit $q(t) = q_{max}(1 - e^{-t/\tau})$ Apply the relationship giving the charge as a function of time for a capacitor in a discharging RC circuit $q(t) = q_{max} e^{-t/\tau}$	As mentioned in EXAMPLE 6.3	155-157
SWIFT	11	Identify that the magnetic field vector is always tangent to the magnetic field lines	As mentioned in FIGURE 7.5	170-171
SWIFT	12	Solve problems related to magnetic fields and magnetic forces on charged particles Apply the right-hand rule to determine the direction of the magnetic force vector which is always perpendicular to both the velocity vector and the magnetic field vector (for a negative charge the force will be in the opposite direction)	As mentioned in the textbook As mentioned in FIGURE 7.12	173
SWIFT	13	Solve problems related to torque on a current-carrying loop	As mentioned in the textbook	184-185
SWIFT	14	(Sketch a current element) in a wire and indicate the direction of the magnetic field that it sets up at a given point near the wire located by theposition vector. State and explain Biot-Savart's law	As mentioned in the textbook As mentioned in FIGURE 8.2	196-197
SWIFT	15	Recall that the SI unit of magnetic field strength is Tesla (T) Apply the equation to determine the magnitude of the magnetic field at a perpendicular distance r⊥ from a long straight current-carrying wire.	As mentioned in the textbook	174 198

Important note: Please pay attention to specifying the units of measurement when solving problems, as grades will be calculated based on the units. Drawing relationships between variables, identifying and drawing the best fit line connecting the points, and finding values from the graph.

ملاحظة هامة: يرجى ضرورة الاهتمام بتحديد وحدات القياس عند حل المسائل، حيث سيرصد درجات على الوحدات كما يرجى تدريب الطلبة على رسم العلاقات بين المتغيرات وتحديد أفضل خط يصل بين النقاط وايجاد قيم من الرسم البياني

Part	Question	Learning Outcome	Example/Exercise	Page
Paper part	1	Distinguish between ohmic and non-ohmic resistors and give examples. Recall and apply Ohm's Law (i=ΔV/R).	As mentioned in the textbook As mentioned in FIGURE 5.2	125-127
Paper part	2	Calculate currents, voltages, and resistances for circuit arrangements containing resistors in series and in parallel. Solve problems involving resistors connected in series and in parallel in a circuit.	As mentioned in the textbook As mentioned in EXAMPLE 5.4	130-132
Paper part	3	Recall and apply Ohm's Law (i=ΔV/R). Solve problems on multiloop circuits. Analyze multiloop circuits by applying both Kirchhoff's loop rule and Kirchhoff's junction rule. Write a system of coupled equations in several unknown variables by applying both the Kirchhoff's rules. Solve the system of coupled equations for the quantities of interest using various techniques, including direct substitution. Express Kirchhoff's loop rule mathematically and apply in problem solving	As mentioned in the textbook As mentioned in FIGURE6.12	125-126 150-152
Paper part	4	Apply the relationship between the magnetic force , charge q, velocity , and the magnetic field B. Apply Newton's second law, for a charged particle in uniform circular motion due to a magnetic force, to derive an expression for the orbital radius r in terms of the magnetic field magnitude B and the particle's mass m, charge magnitude |q|, and speed v Apply the equation to calculate the orbital radius r for a charged particle in a unifrom mgnetic field or other unknown physical quantites	As mentioned in the textbook	175-176
Paper part	5	Apply the equation to determine the magnetic force on a current-carring wire in a uniform magnetic field $\vec{F}_B = i\vec{L} \times \vec{B}$, force magnitude $F_B = iLB\sin\theta$ or other unknown physical quantities, where θ is the angle between the direction of the current flow and the direction of the magnetic field	As mentioned in EXAMPLE 7.4	182-184