TRADE : ELECTRICAL WIREMAN

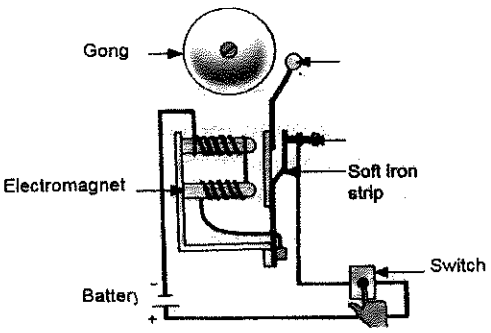
GRADE : II

SERIES : DECEMBER 2025

PAPER : THEORY ANSWERS

Que. No	POSSIBLE ANSWER DETAILS	MAX MARKS
1.	a) Procedures for rescuing a person who is in contact with live parts of an electrical installation i) Ensure your own safety. ii) Turn off the power supply if possible. iii) Use insulating material to separate the victim from the live parts. iv) Check for vital signs (pulse and breathing). v) Begin CPR if the person is not breathing or has no pulse. vi) Call emergency services immediately. vii)Stay with the victim until medical help arrives.	**(4x1=4 Marks)**
	b) State the application of the following types of fire extinguishers. (i) Foam: - commonly used in fire extinguishers to suppress class A (solid materials) and class B (flammable liquids) fires. Foam forms a blanket over the burning material, cutting off oxygen and cooling the fire. (ii) Carbon Dioxide: - used in fire extinguishers to fight class B (flammable liquids) and class C (electrical) fires. It works by displacing oxygen and reducing the oxygen concentration around the fire.	**(2x1=2 Marks)**
2.	a) Definition of terms i) Current rating: It is the maximum current which a fuse can carry without any undue deterioration. ii) Fusing current: It is the minimum current at which a fuse element melts. iii) Fusing factor: defined as the ratio of minimum fusing current to current rating of a fusing element.	**(3x2=6 Marks)**

	b. Relevant IEE regulations in reference to domestic circuits. i) Protection against electric shock (e.g., proper earthing). ii) Correct circuit isolation and identification of final circuits.	**(Any 2x1 =2 Marks)**
3.	a) Definition of the term Final Sub-circuit Is an outgoing circuit connected to the distribution board or consumer control unit and intended to supply electrical energy to current using apparatus either directly or indirectly through socket outlets or fixed spur boxes.	**(2 Marks)**
	b) Factors influencing the choice of a wiring system i) Nature of the building (residential, industrial). ii) Environmental conditions (moisture, heat). iii) Aesthetic considerations. iv) Cost and availability of materials v) Type of building vi) Safety	**(Any 4x1= 4 Marks)**
4.	Procedures for performing polarity test i) Open the main switch and remove all fuses ii) Ensure that all the circuit fuses are all in place in the distribution board or consumer control unit iii) Connect the live terminal in the installation side of the main switch to the consumers main earth terminal iv) Remove all the lamps from their holders and disconnect all the appliances v) Place all the switches to off position vi) Connect one lead of the tester to the consumers' main earth terminal vii) Connect the other lead to the terminal in turn to the single pole switch viii) The reading is zero or near zero to show correct polarity	**(5 Marks)**
5.	Difference between a ring and a radial circuit. - A radial circuit is where the feeders to each socket or sockets are taken directly from the consumer unit without a return loop while - A ring circuit has two feeders coming and return which both comes from the same supply to form a loop circuit	**(2x2 =4 Marks)**

	Disadvantages of Concealed Conduit Wiring System i) It's expensive when compared to other surface conducting methods ii) It's very hard to find any defects in the wiring iii) Adding additional conduits in future is cumbersome (Needs wall chiseling and finishing) iv) Changing the location of appliances or switches is difficult v) Installation is difficult as compared to other methods vi) Complicated to add/manage additional connection in the future	**(Any3x1=3 Marks)**
6.	Segregation of circuits is the separation of different types of electrical circuits (e.g., lighting, power, emergency, fire alarm) into individual conduits or cable trays due to their difference in power to avoid electromagnetic interference and ensure safety.	**(2 Marks)**
7.	Operation of a continuous ringing  □ **Operation:** When the button or switch is pressed, current flows through the circuit and energizes the electromagnet. The electromagnet attracts the nearby iron armature. As the armature moves toward it, the hammer strikes the bell gong. The movement of the armature also opens the trembler contact. When current stops, the electromagnet loses its magnetism. The armature is then pulled back by the spring to its original position. The armature's return closes the contact again, re-energizing the coil. This make-and-break cycle happens rapidly (many times per second), causing the hammer to vibrate and continuously strike the bell as long as the push button is pressed.	**(Correct diagram and labeling 4 Marks)** **(correct operation 4 Marks)**
8.	Functions of the following components in fluorescent lamp fitting.	

	i) Choke - The choke steps up the supply voltage for starting the lamp and also limits the current once the lamp has started ii) Fluorescent powder – converts the invisible ultra – violet rays into visible light. iii) A capacitor across the supply -Capacitor across the supply is for power factor improvement iv) Starter - The starter assists the starting of the lamp by interrupting supply through the choke to enable it produce high starting voltage v) Capacitor in the starter is for radio –wave interference suppression	**(4 X 1 =4 Marks)**
9.	a) Definition of ohms' law It states that current is directly proportional to voltage and inversely proportional to resistance as long as the temperature remains constant.	**(2 Marks)**
	a) 12 V battery is connected to a series combination of a 4 Ω resistor and a 6 Ω resistor. i. Total Resistance: R total=R1+R2=4 Ω+6 Ω=10 ΩR ii. Current in the Circuit Using Ohm's Law: $I = \frac{V}{R}$ $$I = \frac{12}{10} = 1.2\text{A}$$ iii. Voltage Drop Across Each Resistor: • Voltage drop across 4 Ω resistor V = IR V 1 = 1.2 A×4 Ω=**4.8 V** • Voltage drop across 6 Ω resistor V2=IR V2 = 1.2 A×6 Ω = **7.2 V**	**(3 x2 =6 Marks)**
10.	a) Total Capacitance (C total)	

	In a parallel combination of capacitors, the total capacitance is the sum of the individual capacitances: Total capacitance = C1+C2+C3+C4 =4 µF+4 µF+4 µF+4 µF **=16 µF** b) Total Charge (Q total) For the total charge in the circuit, use the total capacitance: Q total = C×V=16 µF×16 V Total charge is **256 µC**	**(2 Marks)** **(2 Marks)**
	TOTAL	**(58 Marks)**

(MARKS= $\frac{\mathbf{X}}{\mathbf{58}} \times \mathbf{15}$**)**

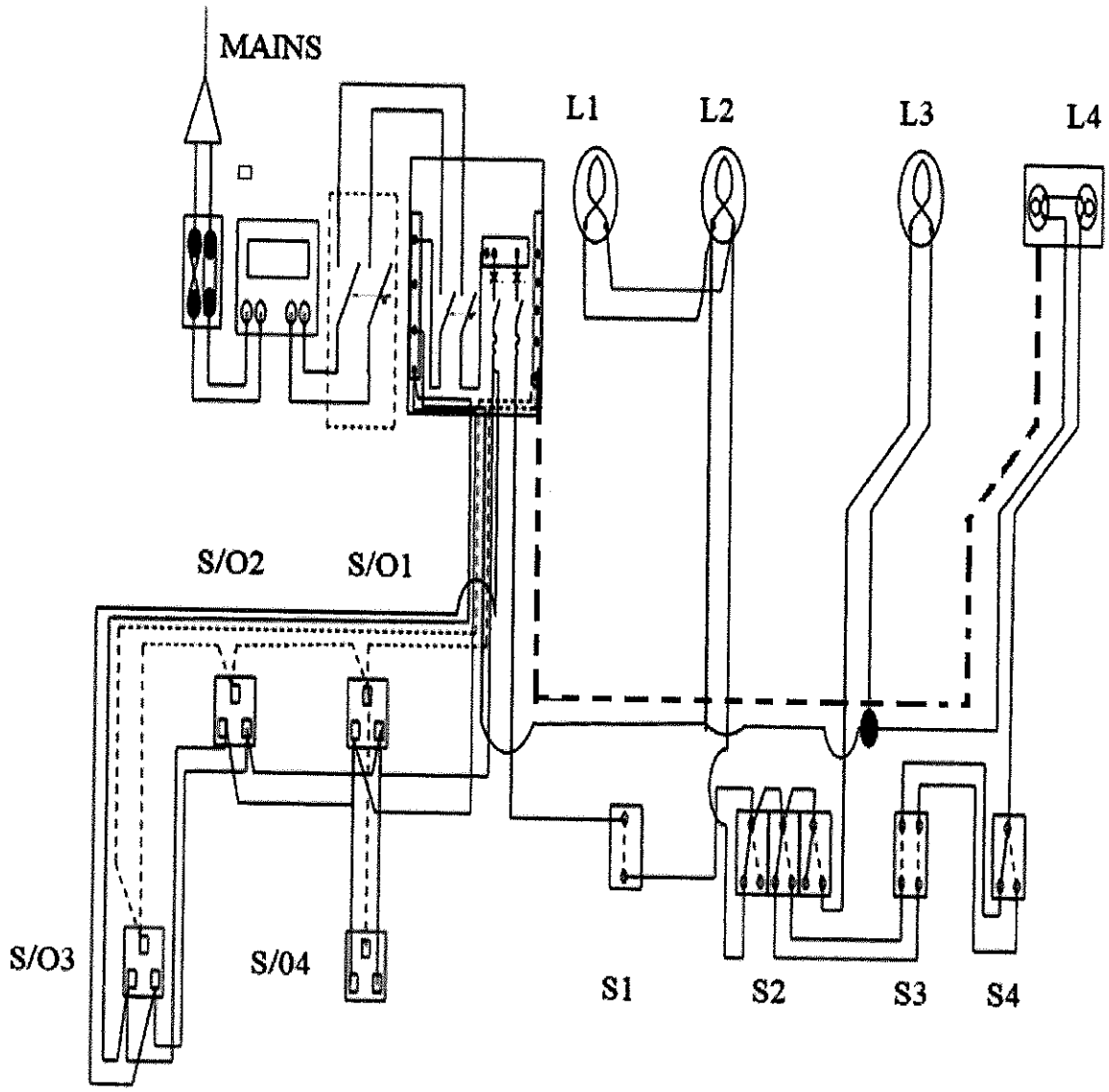
TRADE : **ELECTRICAL WIREMAN**

GRADE : **II**

SERIES : **DECEMBER 2025**

PAPER : **PRACTICAL**

Project 1 wiring Diagram Solution



TRADE : ELECTRICAL WIREMAN

GRADE : II

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PAPER : PRACTICAL

MATERIALS ESTIMATE FOR PROJECT 1

NO	DESCRIPTION	UNIT	QUANTITY
1.	Single cut out 80A	No.	1
2.	Switch fuse	No.	1
3.	Energy Meter	No.	1
4.	4 Way consumer control unit (Complete)	No.	1
5.	1.5mm^2 single core cable; Red	metre	8.5
6.	Black	metre	5.5
7.	Green/ Yellow	metre	2
8.	2.5mm^2 single core cable; Red	metre	2
9.	Black	metre	2
10.	Green/ Yellow	metre	2
11.	4.0mm^2 single core cable; Red	metre	1
12.	Black	metre	1
13.	Green/ Yellow	metre	1
14.	2ft Fluorescent fitting complete (LED)	No.	1
15.	One way one gang switches	No.	1
16.	Two-way Three Gang switches	No.	1
17.	Two-way One gang switch	No.	1

18.	Intermediate switch	No.	1
19.	13A switched socket outlet single	No.	3
20.	20mm spacer saddles	No.	25
21.	20mm PVC heavy gauge conduit	Length	1½
22.	¾inch "Gypsum screws	packet	½
23.	1" Gypsum screws	No.	10
24.	20mm PVC End box	No.	2
25.	20mm PVC couplers	No.	15
26.	20mm PVC Male bushes	No.	10
27.	13 A socket outlet	No.	1
28.	Single PVC switch boxes	No.	8
29.	SP 10A MCB	No.	1
30.	SP 20A MCB	No.	1
31.	Lamp Holders	No.	3
32.	LED bulbs	No.	3

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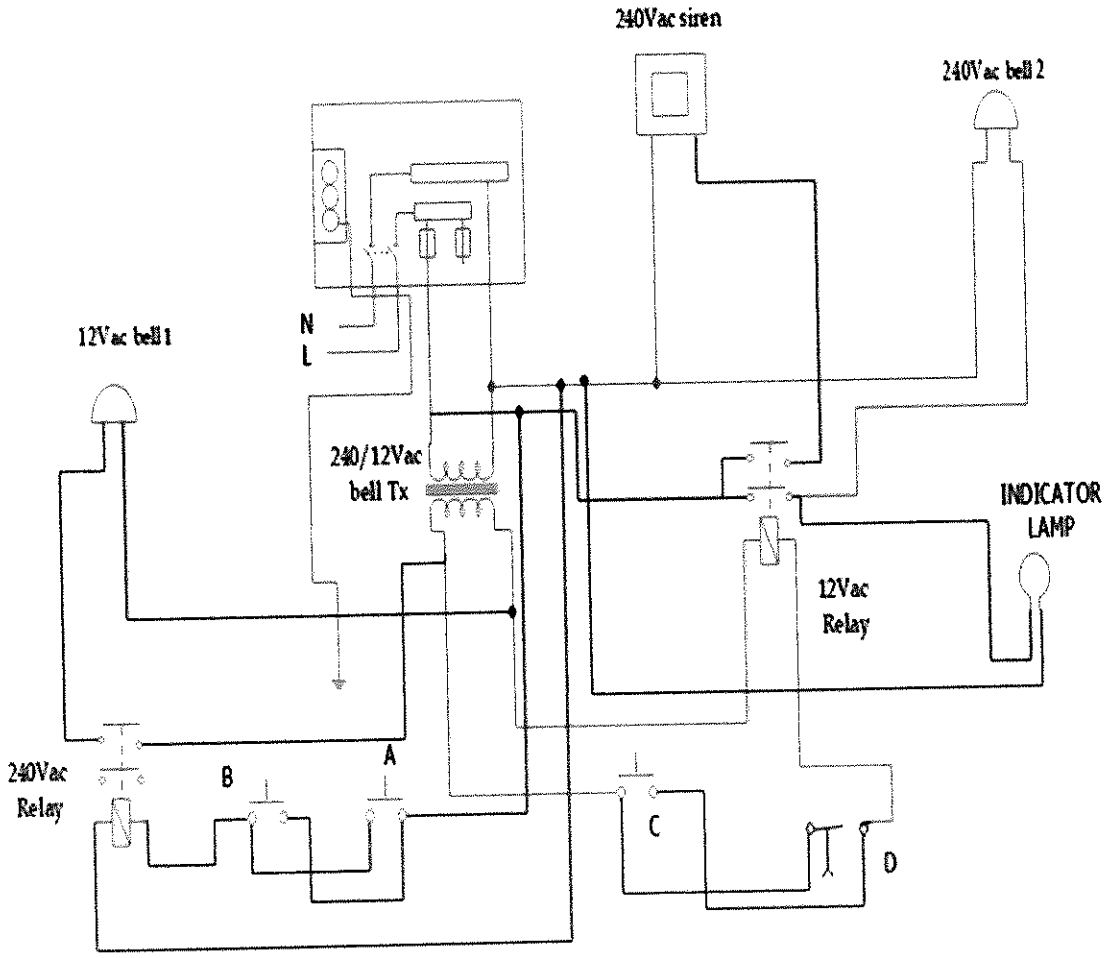
Project 2 wiring Diagram Solution



TRADE : ELECTRICAL WIREMAN

GRADE : II

SERIES : DECEMBER 2025

MATERIALS ESTIMATE FOR PROJECT 2

NO	DESCRIPTION	UNIT	QUANTITY
1.	4 Way consumer control unit (Complete)	No.	1
2.	1.5mm² single core cable; Red	meters	2.8
	Black	meters	2.0
3.	¾inch "Gypsum screws	Packet	½
4.	Lamp Holder	No.	1
5.	Cord operated switch	No.	1
6.	LED bulb	No.	1
7.	12V Bell	No.	1
8.	240 V Siren	No.	1
9.	240/12 V Bell Transformer	No.	1
10.	240 V Relay	No.	1
11.	Push buttons	No.	3
12.	12 V Relay	No.	1
13.	240 V Indicator lamp	No.	1
14.	240 V bell	No.	1
15.	Mini trunk	Length	2
16.	Shallow pattress box	No.	3
17.	Bell wire 0.75mm2	Meters	2.5