3.7 Physics: Electricity, Magnetism and Waves: 2-hour Pack

Total Marks

ISEB CE 13+ Science (Physics) · Calculator allowed · about 120 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A motor coil has a resistance of 8 ohm and draws a current of 3 A. Calculate the voltage needed.

(1)

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2 Three lamps are connected in series to a 9 V supply. The potential difference across the first lamp is 2 V and across the second is 1 V. What is the potential difference across the third lamp?

- ☐ A) 7 V
- ☐ B) 6 V
- ☐ C) 9 V
- ☐ D) 60 V
- ☐ E) 3 V

---

3 A heater rated at 1000 W is used for 1 hour. Calculate the energy transferred in kWh.

- ☐ A) 10 kWh
- ☐ B) 1000 kWh
- ☐ C) 0.1 kWh
- ☐ D) 1 kWh
- ☐ E) 60 kWh

---

4 A sound wave travels at 340 m/s and has a frequency of 170 Hz. Calculate its wavelength in m.

- ☐ A) 57800 m
- ☐ B) 0.5 m
- ☐ C) 20 m
- ☐ D) 170 m
- ☐ E) 2 m

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5 A student claps near a building wall and hears the echo 2.5 s later. The speed of sound in air is 340 m/s. Calculate the total distance travelled by the sound wave.

(1)

---

6 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 0.3 A and the ammeter in the second branch reads 0.5 A. What current flows through the cell?

- ☐ A) 0.2 A
- ☐ B) 0.15 A
- ☐ C) 0.4 A
- ☐ D) 0.8 A
- ☐ E) 0.5 A

---

7 A heater rated at 100 W is used for 2 hours. Electricity costs 35 p per kWh. Calculate the cost in pence.

- ☐ A) 7 p
- ☐ B) 7000 p
- ☐ C) 35.2 p
- ☐ D) 70 p
- ☐ E) 0.2 p

---

8 A current of 0.5 A flows through a heater element of resistance 10 ohm. Calculate the potential difference across it in V.

- ☐ A) 10.5 V
- ☐ B) 9.5 V
- ☐ C) 5 V
- ☐ D) 20 V
- ☐ E) 0.05 V

---

9 A washing machine uses 2.5 kW of power and operates for 1.5 hours. How much energy does it transfer in kWh?

(1)

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10 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 1.5 A and the ammeter in the second branch reads 1 A. What current flows through the cell?

- [ ] A) 0.5 A
- [ ] B) 1.5 A
- [ ] C) 2.5 A
- [ ] D) 1.25 A
- [ ] E) 25 A

---

11 A washing machine rated at 1500 W is used for 2 hours. Electricity costs 25 p per kWh. Calculate the cost in pence.

- [ ] A) 0.12 p
- [ ] B) 3 p
- [ ] C) 75 p
- [ ] D) 28 p
- [ ] E) 75000 p

---

12 A current of 3 A flows through a wire of resistance 8 ohm. Calculate the potential difference across it in V.

- [ ] A) 24 V
- [ ] B) 0.375 V
- [ ] C) 240 V
- [ ] D) 5 V
- [ ] E) 11 V

---

13 A water wave has a frequency of 4 Hz and a wavelength of 0.25 m. Calculate its speed in m/s.

- [ ] A) 4.25 m/s
- [ ] B) 10 m/s
- [ ] C) 0.1 m/s
- [ ] D) 1 m/s
- [ ] E) 16 m/s

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14 An electric cooker is rated at 11.5 kW on a 230 V mains supply. Calculate the current in amperes.

(1)

---

15 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 1.2 A and the ammeter in the second branch reads 0.25 A. What current flows through the cell?

- ☐ A) 0.725 A
- ☐ B) 0.95 A
- ☐ C) 0.3 A
- ☐ D) 1.45 A
- ☐ E) 1.2 A

---

16 A washing machine rated at 500 W is used for 0.5 hours. Calculate the energy transferred in kWh.

- ☐ A) 250 kWh
- ☐ B) 15 kWh
- ☐ C) 0.5 kWh
- ☐ D) 1 kWh
- ☐ E) 0.25 kWh

---

17 A current of 5 A flows through a wire of resistance 20 ohm. Calculate the potential difference across it in V.

- ☐ A) 15 V
- ☐ B) 25 V
- ☐ C) 0.25 V
- ☐ D) 100 V
- ☐ E) 4 V

---

18 A student shouts towards a canyon wall and hears the echo 2.0 s later. The speed of sound in air is 340 m/s. Calculate the total distance travelled by the sound wave (there and back).

(1)

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19 A sound wave has a frequency of 100 Hz and a wavelength of 3.4 m. Calculate its speed in m/s.

- [ ] A) 340 m/s
- [ ] B) 3400 m/s
- [ ] C) 103.4 m/s
- [ ] D) 34 m/s
- [ ] E) 0.034 m/s

---

20 Which unit is used to measure electric potential difference (voltage)?

- [ ] A) Coulomb
- [ ] B) Hertz
- [ ] C) Volt
- [ ] D) Joule

---

21 Three lamps are connected in series to a 9 V supply. The potential difference across the first lamp is 3 V and across the second is 2 V. What is the potential difference across the third lamp?

- [ ] A) 3 V
- [ ] B) 9 V
- [ ] C) 6 V
- [ ] D) 5 V
- [ ] E) 4 V

---

22 A kettle rated at 2000 W is used for 15 minutes. Calculate the energy transferred in kWh.

- [ ] A) 5 kWh
- [ ] B) 0.5 kWh
- [ ] C) 30 kWh
- [ ] D) 30000 kWh
- [ ] E) 2 kWh

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23 A current of 4 A flows through a wire of resistance 20 ohm. Calculate the potential difference across it in V.

- ☐ A) 0.2 V
- ☐ B) 80 V
- ☐ C) 24 V
- ☐ D) 16 V
- ☐ E) 5 V

---

24 A 6 ohm and a 4 ohm resistor are in series in a circuit carrying 3 A. Calculate the voltage across the 4 ohm resistor.

(1)

---

25 Ammeter A1 reads 0.5 A in a series circuit containing 3 lamps. What does a second ammeter, placed after the last lamp, read?

- ☐ A) 0.25 A
- ☐ B) 0.5 A
- ☐ C) 0.05 A
- ☐ D) 1.5 A
- ☐ E) 5 A

---

26 A washing machine rated at 500 W is used for 120 minutes. Calculate the energy transferred in kWh.

- ☐ A) 10 kWh
- ☐ B) 0.5 kWh
- ☐ C) 1 kWh
- ☐ D) 60 kWh
- ☐ E) 60000 kWh

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27 A current of 0.5 A flows through a lamp of resistance 12 ohm. Calculate the potential difference across it in V.

- [ ] A) 11.5 V
- [ ] B) 12.5 V
- [ ] C) 24 V
- [ ] D) 6 V
- [ ] E) 60 V

---

28 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 0.8 A and the ammeter in the second branch reads 0.25 A. What current flows through the cell?

- [ ] A) 0.525 A
- [ ] B) 1.05 A
- [ ] C) 0.55 A
- [ ] D) 0.8 A
- [ ] E) 0.2 A

---

29 A sound wave has a frequency of 1700 Hz and a wavelength of 0.2 m. Calculate its speed in m/s.

- [ ] A) 1700.2 m/s
- [ ] B) 3400 m/s
- [ ] C) 34 m/s
- [ ] D) 8500 m/s
- [ ] E) 340 m/s

---

30 A bathroom mirror is rotated 8 degrees from vertical while light from a window strikes it at a fixed angle. Through how many degrees does the reflected light turn?

(1)

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31 An electric shower rated at 1500 W is used for 40 minutes. Calculate the energy transferred in kWh.

- [ ] A) 1 kWh
- [ ] B) 10 kWh
- [ ] C) 60 kWh
- [ ] D) 60000 kWh
- [ ] E) 1.5 kWh

---

32 A potential difference of 15 V is applied across a resistor of resistance 300 ohm. Calculate the current in mA.

- [ ] A) 4.5 mA
- [ ] B) 50 mA
- [ ] C) 0.05 mA
- [ ] D) 5 mA
- [ ] E) 20 mA

---

33 A wave on a rope has a frequency of 10 Hz and a wavelength of 0.5 m. Calculate its speed in m/s.

- [ ] A) 50 m/s
- [ ] B) 5 m/s
- [ ] C) 10.5 m/s
- [ ] D) 0.05 m/s
- [ ] E) 20 m/s

---

34 A petrol engine receives 300 J of chemical energy from fuel and converts 75 J into mechanical work. The rest is lost as heat. What is the efficiency?

(1)

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35 A cell supplies 2.9 A to two lamps in parallel. The current through the first lamp is 2 A. What is the current through the second lamp?

- [ ] A) 5.8 A
- [ ] B) 1.45 A
- [ ] C) 0.9 A
- [ ] D) 4.9 A
- [ ] E) 2 A

---

36 A washing machine rated at 3000 W is used for 15 minutes. Calculate the energy transferred in kWh.

- [ ] A) 0.2 kWh
- [ ] B) 3 kWh
- [ ] C) 45000 kWh
- [ ] D) 45 kWh
- [ ] E) 0.75 kWh

---

37 A current of 0.5 A flows through a resistor of resistance 20 ohm. Calculate the potential difference across it in V.

- [ ] A) 0.025 V
- [ ] B) 40 V
- [ ] C) 19.5 V
- [ ] D) 10 V
- [ ] E) 20.5 V

---

38 A wave on a rope has a frequency of 2 Hz and a wavelength of 3 m. Calculate its speed in m/s.

- [ ] A) 6 m/s
- [ ] B) 5 m/s
- [ ] C) 60 m/s
- [ ] D) 1.5 m/s
- [ ] E) 0.6 m/s

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39 Four resistors of 2 ohm, 3 ohm, 4 ohm, and 1 ohm are wired in series. What is the total resistance?

(1)

---

40 Ammeter A1 reads 0.5 A in a series circuit containing 2 lamps. What does a second ammeter, placed after the last lamp, read?

- ☐ A) 0.25 A
- ☐ B) 0.5 A
- ☐ C) 0.05 A
- ☐ D) 5 A
- ☐ E) 1 A

---

41 An electric shower rated at 3000 W is used for 45 minutes. Calculate the energy transferred in kWh.

- ☐ A) 135 kWh
- ☐ B) 22.5 kWh
- ☐ C) 135000 kWh
- ☐ D) 3 kWh
- ☐ E) 2.25 kWh

---

42 A potential difference of 50 V is applied across a heater element of resistance 50 ohm. Calculate the current in A.

- ☐ A) 2 A
- ☐ B) 10 A
- ☐ C) 0.1 A
- ☐ D) 1 A
- ☐ E) 2500 A

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43 A wave on a spring travels at 6 m/s and has a frequency of 5 Hz. Calculate its wavelength in m.

- [ ] A) 12 m
- [ ] B) 1 m
- [ ] C) 1.2 m
- [ ] D) 0.12 m
- [ ] E) 30 m

---

44 A student investigates how temperature affects the resistance of a thermistor. She keeps the thermistor constant and measures resistance at different temperatures. Identify the independent variable.

(1)

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45 An electric shower rated at 1000 W is used for 90 minutes. Calculate the energy transferred in kWh.

- [ ] A) 15 kWh
- [ ] B) 90000 kWh
- [ ] C) 90 kWh
- [ ] D) 1.5 kWh
- [ ] E) 1 kWh

---

46 The potential difference across a wire is 100 V when the current through it is 2 A. Calculate its resistance in ohm.

- [ ] A) 0.02 ohm
- [ ] B) 50 ohm
- [ ] C) 200 ohm
- [ ] D) 98 ohm
- [ ] E) 500 ohm

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47 A current of 2 A flows through a resistor of resistance 15 ohm. Calculate the potential difference across it in V.

- ☐ A) 30 V
- ☐ B) 17 V
- ☐ C) 7.5 V
- ☐ D) 13 V
- ☐ E) 300 V

---

48 A water wave travels at 4 m/s and has a frequency of 2 Hz. Calculate its wavelength in m.

- ☐ A) 0.5 m
- ☐ B) 2 m
- ☐ C) 0.2 m
- ☐ D) 20 m
- ☐ E) 8 m

---

49 An air conditioning unit uses 2 kW for 6 hours. At 20p per kWh, what is the total cost?

(1)

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50 A cell supplies 2 A to two lamps in parallel. The current through the first lamp is 1 A. What is the current through the second lamp?

- ☐ A) 10 A
- ☐ B) 3 A
- ☐ C) 1 A
- ☐ D) 2 A
- ☐ E) 0.1 A

---

51 A washing machine rated at 2000 W is used for 15 minutes. Electricity costs 15 p per kWh. Calculate the cost in pence.

- ☐ A) 0.5 p
- ☐ B) 450000 p
- ☐ C) 15.5 p
- ☐ D) 450 p
- ☐ E) 7.5 p

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52 A water wave travels at 3 m/s and has a frequency of 2 Hz. Calculate its wavelength in m.

- ☐ A) 15 m
- ☐ B) 1 m
- ☐ C) 1.5 m
- ☐ D) 6 m
- ☐ E) 0.15 m

---

53 A solar panel receives 200 J of solar energy and converts 50 J into electrical energy. Calculate its efficiency.

(1)

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54 A cell supplies 1.5 A to two lamps in parallel. The current through the first lamp is 0.5 A. What is the current through the second lamp?

- ☐ A) 1 A
- ☐ B) 2 A
- ☐ C) 0.5 A
- ☐ D) 0.75 A
- ☐ E) 10 A

---

55 An electric shower rated at 2000 W is used for 45 minutes. Electricity costs 25 p per kWh. Calculate the cost in pence.

- ☐ A) 26.5 p
- ☐ B) 2250000 p
- ☐ C) 1.5 p
- ☐ D) 37.5 p
- ☐ E) 2250 p

---

56 A water wave has a frequency of 0.5 Hz and a wavelength of 4 m. Calculate its speed in m/s.

- ☐ A) 20 m/s
- ☐ B) 8 m/s
- ☐ C) 0.125 m/s
- ☐ D) 4.5 m/s
- ☐ E) 2 m/s

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57 Which statement describes a switch in a circuit?

- ☐ A) opens and closes a circuit
- ☐ B) allows current to flow in one direction only
- ☐ C) changes the current by changing the resistance
- ☐ D) has a resistance that falls as the temperature rises
- ☐ E) melts and breaks the circuit if the current is too high

---

58 Which of these materials is NOT an electrical insulator?

- ☐ A) plastic
- ☐ B) rubber
- ☐ C) ceramic
- ☐ D) glass
- ☐ E) steel

---

59 A student investigates how the type of material affects the resistance of a wire. She keeps the length, diameter and temperature constant for each material tested. Identify the dependent variable.

(1)

---

60 3 identical lamps are connected in parallel across a 3 V battery. What is the potential difference across one lamp?

- ☐ A) 3 V
- ☐ B) 30 V
- ☐ C) 9 V
- ☐ D) 1 V
- ☐ E) 0.75 V

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61 An electric shower rated at 2500 W is used for 0.5 hours. Electricity costs 20 p per kWh. Calculate the cost in pence.

- [ ] A) 25000 p
- [ ] B) 21.25 p
- [ ] C) 1.25 p
- [ ] D) 250 p
- [ ] E) 25 p

---

62 A current of 0.2 A flows through a lamp of resistance 20 ohm. Calculate the potential difference across it in V.

- [ ] A) 4 V
- [ ] B) 0.01 V
- [ ] C) 19.8 V
- [ ] D) 100 V
- [ ] E) 20.2 V

---

63 A sound wave travels at 340 m/s and has a frequency of 850 Hz. Calculate its wavelength in m.

- [ ] A) 0.4 m
- [ ] B) 2.5 m
- [ ] C) 4 m
- [ ] D) 289000 m
- [ ] E) 0.04 m

---

64 Which circuit component allows current to flow in one direction only?

- [ ] A) motor
- [ ] B) voltmeter
- [ ] C) variable resistor
- [ ] D) ammeter
- [ ] E) diode

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65 Which of these materials is not attracted by a magnet?

- ☐ A) cobalt
- ☐ B) aluminium
- ☐ C) iron
- ☐ D) steel
- ☐ E) nickel

---

66 A sonar pulse is sent from a submarine and the echo returns after 4.0 s. The speed of sound in seawater is 1500 m/s. Calculate the total distance travelled by the sound wave (down and back up).

(1)

---

67 2 identical lamps are connected in parallel across a 3 V battery. What is the potential difference across one lamp?

- ☐ A) 1.5 V
- ☐ B) 6 V
- ☐ C) 1 V
- ☐ D) 30 V
- ☐ E) 3 V

---

68 An electric shower rated at 3000 W is used for 8 hours. Calculate the energy transferred in kWh.

- ☐ A) 0.375 kWh
- ☐ B) 1440 kWh
- ☐ C) 24000 kWh
- ☐ D) 24 kWh
- ☐ E) 3 kWh

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69 The potential difference across a wire is 20 V when the current through it is 1 A. Calculate its resistance in ohm.

- [ ] A) 2 ohm
- [ ] B) 19 ohm
- [ ] C) 20 ohm
- [ ] D) 200 ohm
- [ ] E) 0.05 ohm

---

70 A wave on a rope has a frequency of 10 Hz and a wavelength of 1.5 m. Calculate its speed in m/s.

- [ ] A) 15 m/s
- [ ] B) 1.5 m/s
- [ ] C) 11.5 m/s
- [ ] D) 150 m/s
- [ ] E) 0.15 m/s

---

71 Which statement describes a diode in a circuit?

- [ ] A) measures the potential difference across a component
- [ ] B) allows current to flow in one direction only
- [ ] C) measures the current in a circuit
- [ ] D) changes the current by changing the resistance
- [ ] E) opens and closes a circuit

---

72 Which of these materials is NOT a good electrical conductor?

- [ ] A) copper
- [ ] B) graphite
- [ ] C) steel
- [ ] D) glass
- [ ] E) silver

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73 Which of these materials is not attracted by a magnet?

- ☐ A) steel
- ☐ B) cobalt
- ☐ C) wood
- ☐ D) iron
- ☐ E) nickel

---

74 Three resistors of 10 ohm, 6 ohm and 14 ohm are connected in series. Calculate the total resistance of the circuit.

(1)

---

75 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 0.5 A and the ammeter in the second branch reads 1 A. What current flows through the cell?

- ☐ A) 1 A
- ☐ B) 0.75 A
- ☐ C) 15 A
- ☐ D) 0.5 A
- ☐ E) 1.5 A

---

76 A kettle rated at 2500 W is used for 1 hour. Electricity costs 30 p per kWh. Calculate the cost in pence.

- ☐ A) 75 p
- ☐ B) 2.5 p
- ☐ C) 75000 p
- ☐ D) 750 p
- ☐ E) 32.5 p

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77 A potential difference of 25 V is applied across a lamp of resistance 25 ohm. Calculate the current in A.

- [ ] A) 0.1 A
- [ ] B) 2 A
- [ ] C) 10 A
- [ ] D) 1 A
- [ ] E) 625 A

---

78 A sound wave has a frequency of 500 Hz and a wavelength of 0.68 m. Calculate its speed in m/s.

- [ ] A) 3400 m/s
- [ ] B) 34 m/s
- [ ] C) 500.68 m/s
- [ ] D) 680 m/s
- [ ] E) 340 m/s

---

79 Which circuit component changes the current by changing the resistance?

- [ ] A) diode
- [ ] B) thermistor
- [ ] C) buzzer
- [ ] D) variable resistor
- [ ] E) voltmeter

---

80 Which of these materials is a good electrical conductor?

- [ ] A) dry wood
- [ ] B) glass
- [ ] C) silver
- [ ] D) ceramic
- [ ] E) cotton cloth

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81 Which of these materials is not attracted by a magnet?

- [ ] A) iron
- [ ] B) cobalt
- [ ] C) steel
- [ ] D) nickel
- [ ] E) brass

---

82 A circuit consists of a 10 ohm resistor in series with a parallel combination of 15 ohm and 30 ohm resistors. Calculate the total resistance.

(1)

---

83 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 2 A and the ammeter in the second branch reads 1 A. What current flows through the cell?

- [ ] A) 1.5 A
- [ ] B) 1 A
- [ ] C) 3 A
- [ ] D) 2 A
- [ ] E) 30 A

---

84 An electric shower rated at 100 W is used for 8 hours. Calculate the energy transferred in kWh.

- [ ] A) 0.8 kWh
- [ ] B) 8 kWh
- [ ] C) 800 kWh
- [ ] D) 48 kWh
- [ ] E) 0.1 kWh

---

85 A current of 5 A flows through a resistor of resistance 2 ohm. Calculate the potential difference across it in V.

- [ ] A) 2.5 V
- [ ] B) 10 V
- [ ] C) 7 V
- [ ] D) 100 V
- [ ] E) 0.4 V

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86 Which circuit component melts and breaks the circuit if the current is too high?

- ☐ A) motor
- ☐ B) ammeter
- ☐ C) voltmeter
- ☐ D) fuse
- ☐ E) switch

---

87 Which of these materials is an electrical insulator?

- ☐ A) graphite
- ☐ B) rubber
- ☐ C) steel
- ☐ D) aluminium
- ☐ E) silver

---

88 A component in a circuit has a resistance of 15 ohm. A current of 0.4 A flows through it. Calculate the voltage across the component.

(2)

---

89 Which of these materials is attracted by a magnet?

- ☐ A) silver
- ☐ B) copper
- ☐ C) wood
- ☐ D) brass
- ☐ E) cobalt

---

90 A circuit contains a parallel combination of three resistors: 12 ohm, 6 ohm, and 4 ohm. Calculate the combined resistance of this parallel section.

(1)

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91 2 identical lamps are connected in parallel across a 4.5 V battery. What is the potential difference across one lamp?

- [ ] A) 4.5 V
- [ ] B) 9 V
- [ ] C) 2.25 V
- [ ] D) 1.5 V
- [ ] E) 2.5 V

---

92 A kettle rated at 2000 W is used for 2 hours. Calculate the energy transferred in kWh.

- [ ] A) 2 kWh
- [ ] B) 240 kWh
- [ ] C) 1 kWh
- [ ] D) 4000 kWh
- [ ] E) 4 kWh

---

93 A wave on a rope has a frequency of 5 Hz and a wavelength of 2 m. Calculate its speed in m/s.

- [ ] A) 10 m/s
- [ ] B) 100 m/s
- [ ] C) 0.4 m/s
- [ ] D) 2.5 m/s
- [ ] E) 7 m/s

---

94 Which statement describes a thermistor in a circuit?

- [ ] A) measures the current in a circuit
- [ ] B) opens and closes a circuit
- [ ] C) has a resistance that falls as the temperature rises
- [ ] D) allows current to flow in one direction only
- [ ] E) melts and breaks the circuit if the current is too high

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95 Which of these materials is NOT an electrical insulator?

- ☐ A) ceramic
- ☐ B) dry wood
- ☐ C) glass
- ☐ D) graphite
- ☐ E) plastic

---

96 Which of these materials is not attracted by a magnet?

- ☐ A) iron
- ☐ B) steel
- ☐ C) gold
- ☐ D) nickel
- ☐ E) cobalt

---

97 An electric motor converts electrical energy into mechanical energy. For every 500 J of electrical energy supplied, it usefully transfers 450 J as mechanical energy. Calculate the efficiency of the motor.

(1)

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98 Two resistors of 5 ohm and 7 ohm are connected in series in a circuit. A current of 2 A flows through the circuit.

(a) Calculate the total resistance of the circuit. **(1)**

.....

(b) Calculate the voltage across the 7 ohm resistor. **(2)**

.....

(c) Calculate the total voltage supplied by the battery. **(1)**

.....

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99 Ammeter A1 reads 0.8 A in a series circuit containing 2 lamps. What does a second ammeter, placed after the last lamp, read?

- [ ] A) 0.4 A
- [ ] B) 0.8 A
- [ ] C) 1.6 A
- [ ] D) 8 A
- [ ] E) 0.08 A

---

100 A current of 4 A flows through a wire of resistance 15 ohm. Calculate the potential difference across it in V.

- [ ] A) 3.75 V
- [ ] B) 11 V
- [ ] C) 600 V
- [ ] D) 60 V
- [ ] E) 19 V

---

101 A water wave travels at 1.5 m/s and has a wavelength of 0.5 m. Calculate its frequency in Hz.

- [ ] A) 3 Hz
- [ ] B) 0.75 Hz
- [ ] C) 30 Hz
- [ ] D) 1 Hz
- [ ] E) 0.3 Hz

---

102 Which circuit component has a resistance that falls as the light gets brighter?

- [ ] A) buzzer
- [ ] B) fuse
- [ ] C) switch
- [ ] D) ammeter
- [ ] E) light-dependent resistor

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103 Which of these materials is an electrical insulator?

- ☐ A) graphite
- ☐ B) iron
- ☐ C) steel
- ☐ D) dry wood
- ☐ E) copper

---

104 Which of these materials is not attracted by a magnet?

- ☐ A) steel
- ☐ B) nickel
- ☐ C) silver
- ☐ D) iron
- ☐ E) cobalt

---

105 In an electronic device, three switches are arranged so that flipping any one switch changes the brightness level, and each switch is on its own separate branch with no shared component path. Identify whether these switches are connected in series or in parallel.

(1)

---

106 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 0.8 A and the ammeter in the second branch reads 0.5 A. What current flows through the cell?

- ☐ A) 0.65 A
- ☐ B) 0.4 A
- ☐ C) 0.3 A
- ☐ D) 1.3 A
- ☐ E) 0.8 A

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107 Two resistors, 6 ohm and 3 ohm, are connected in parallel across a 12 V supply.

(a) Calculate the combined resistance of the parallel combination. **(2)**

.....

(b) Calculate the total current supplied by the battery. **(2)**

.....

---

108 The potential difference across a wire is 50 V when the current through it is 2.5 A. Calculate its resistance in ohm.

- ☐ A) 0.05 ohm
- ☐ B) 125 ohm
- ☐ C) 200 ohm
- ☐ D) 47.5 ohm
- ☐ E) 20 ohm

---

109 A wave on a rope has a frequency of 8 Hz and a wavelength of 1.5 m. Calculate its speed in m/s.

- ☐ A) 12 m/s
- ☐ B) 9.5 m/s
- ☐ C) 1.2 m/s
- ☐ D) 120 m/s
- ☐ E) 24 m/s

---

110 Which statement describes a light-dependent resistor in a circuit?

- ☐ A) melts and breaks the circuit if the current is too high
- ☐ B) provides the potential difference to push charge round
- ☐ C) measures the current in a circuit
- ☐ D) has a resistance that falls as the temperature rises
- ☐ E) has a resistance that falls as the light gets brighter

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111 Which of these materials is NOT a good electrical conductor?

- [ ] A) silver
- [ ] B) steel
- [ ] C) aluminium
- [ ] D) plastic
- [ ] E) iron

---

112 Which of these materials is not attracted by a magnet?

- [ ] A) nickel
- [ ] B) iron
- [ ] C) copper
- [ ] D) steel
- [ ] E) cobalt

---

113 A ray of light hits a plane mirror. If the mirror is rotated through 25 degrees while the incident ray stays in the same position, calculate the angle through which the reflected ray turns.

(1)

---

114 An oven rated at 2500 W is used for 5 hours. Calculate the energy transferred in kWh.

- [ ] A) 750 kWh
- [ ] B) 12.5 kWh
- [ ] C) 0.5 kWh
- [ ] D) 2.5 kWh
- [ ] E) 12500 kWh

---

115 A potential difference of 200 V is applied across a wire of resistance 40 ohm. Calculate the current in A.

- [ ] A) 160 A
- [ ] B) 0.2 A
- [ ] C) 8000 A
- [ ] D) 5 A
- [ ] E) 50 A

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116 A sound wave has a frequency of 680 Hz and a wavelength of 0.5 m. Calculate its speed in m/s.

- [ ] A) 340 m/s
- [ ] B) 1360 m/s
- [ ] C) 680.5 m/s
- [ ] D) 34 m/s
- [ ] E) 3400 m/s

---

117 Which circuit component measures the current in a circuit?

- [ ] A) voltmeter
- [ ] B) ammeter
- [ ] C) motor
- [ ] D) switch
- [ ] E) thermistor

---

118 Which of these materials is an electrical insulator?

- [ ] A) steel
- [ ] B) graphite
- [ ] C) copper
- [ ] D) cotton cloth
- [ ] E) iron

---

119 Which of these materials is not attracted by a magnet?

- [ ] A) iron
- [ ] B) steel
- [ ] C) cobalt
- [ ] D) nickel
- [ ] E) plastic

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120 Two lamps are connected in parallel to a cell. The ammeter in the first branch reads 1.2 A and the ammeter in the second branch reads 1 A. What current flows through the cell?

- [ ] A) 2.2 A
- [ ] B) 22 A
- [ ] C) 1.1 A
- [ ] D) 0.2 A
- [ ] E) 1.2 A

---

121 An oven rated at 1500 W is used for 2 hours. Calculate the energy transferred in kWh.

- [ ] A) 3000 kWh
- [ ] B) 1.5 kWh
- [ ] C) 3 kWh
- [ ] D) 180 kWh
- [ ] E) 0.75 kWh

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Mark scheme · 3.7 Physics: Electricity, Magnetism and Waves: 2-hour Pack

Question 1

24 V (oe) **B1**

Answer: 24 V

Question 2

B (6 V) **B1**

Answer: B) 6 V

Question 3

D (1 kWh) **B1**

Answer: D) 1 kWh

Question 4

E (2 m) **B1**

Answer: E) 2 m

Question 5

850 m (oe) **B1**

Answer: 850 m

Question 6

D (0.8 A) **B1**

Answer: D) 0.8 A

Question 7

A (7 p) **B1**

Answer: A) 7 p

Question 8

C (5 V) **B1**

Answer: C) 5 V

Question 9

3.75 kWh (oe) **B1**

Answer: 3.75 kWh

Question 10

C (2.5 A) **B1**

Answer: C) 2.5 A

Question 11

C (75 p) **B1**

Answer: C) 75 p

Question 12

A (24 V) **B1**

Answer: A) 24 V

Question 13

D (1 m/s) **B1**

Answer: D) 1 m/s

Question 14

50 A (oe) **B1**

Answer: 50 A

Question 15

D (1.45 A) **B1**

Answer: D) 1.45 A

Question 16

E (0.25 kWh) **B1**

Answer: E) 0.25 kWh

Question 17

D (100 V) **B1**

Answer: D) 100 V

Question 18

680 m (oe) **B1**

Answer: 680 m

Question 19

A (340 m/s) **B1**

Answer: A) 340 m/s

Question 20

C (Volt) cao **B1**

Answer: C) Volt

Question 21

E (4 V) **B1**

Answer: E) 4 V

Question 22

B (0.5 kWh) **B1**

Answer: B) 0.5 kWh

Question 23

B (80 V) **B1**

Answer: B) 80 V

Question 24

12 V (oe) **B1**

Answer: 12 V

Question 25

B (0.5 A) **B1**

Answer: B) 0.5 A

Question 26

C (1 kWh) **B1**

Answer: C) 1 kWh

Question 27

D (6 V) **B1**

Answer: D) 6 V

Question 28

B (1.05 A) **B1**

Answer: B) 1.05 A

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Question 29

E (340 m/s) **B1**

Answer: E) 340 m/s

Question 30

16 degrees (oe) **B1**

Answer: 16 degrees

Question 31

A (1 kWh) **B1**

Answer: A) 1 kWh

Question 32

B (50 mA) **B1**

Answer: B) 50 mA

Question 33

B (5 m/s) **B1**

Answer: B) 5 m/s

Question 34

25% (oe) **B1**

Answer: 25%

Question 35

C (0.9 A) **B1**

Answer: C) 0.9 A

Question 36

E (0.75 kWh) **B1**

Answer: E) 0.75 kWh

Question 37

D (10 V) **B1**

Answer: D) 10 V

Question 38

A (6 m/s) **B1**

Answer: A) 6 m/s

Question 39

10 ohm (oe) **B1**

Answer: 10 ohm

Question 40

B (0.5 A) **B1**

Answer: B) 0.5 A

Question 41

E (2.25 kWh) **B1**

Answer: E) 2.25 kWh

Question 42

D (1 A) **B1**

Answer: D) 1 A

Question 43

C (1.2 m) **B1**

Answer: C) 1.2 m

Question 44

Temperature of the thermistor (oe) **B1**

Answer: Temperature of the thermistor

Question 45

D (1.5 kWh) **B1**

Answer: D) 1.5 kWh

Question 46

B (50 ohm) **B1**

Answer: B) 50 ohm

Question 47

A (30 V) **B1**

Answer: A) 30 V

Question 48

B (2 m) **B1**

Answer: B) 2 m

Question 49

£2.40 (oe) **B1**

Answer: £2.40

Question 50

C (1 A) **B1**

Answer: C) 1 A

Question 51

E (7.5 p) **B1**

Answer: E) 7.5 p

Question 52

C (1.5 m) **B1**

Answer: C) 1.5 m

Question 53

25% (oe) **B1**

Answer: 25%

Question 54

A (1 A) **B1**

Answer: A) 1 A

Question 55

D (37.5 p) **B1**

Answer: D) 37.5 p

Question 56

E (2 m/s) **B1**

Answer: E) 2 m/s

Question 57

A (opens and closes a circuit) **B1**

Answer: A) opens and closes a circuit

Question 58

E (steel) **B1**

Answer: E) steel

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Question 59

Resistance measured in ohms (oe) **B1**

Answer: Resistance measured in ohms

Question 60

A (3 V) **B1**

Answer: A) 3 V

Question 61

E (25 p) **B1**

Answer: E) 25 p

Question 62

A (4 V) **B1**

Answer: A) 4 V

Question 63

A (0.4 m) **B1**

Answer: A) 0.4 m

Question 64

E (diode) **B1**

Answer: E) diode

Question 65

B (aluminium) **B1**

Answer: B) aluminium

Question 66

6000 m (oe) **B1**

Answer: 6000 m

Question 67

E (3 V) **B1**

Answer: E) 3 V

Question 68

D (24 kWh) **B1**

Answer: D) 24 kWh

Question 69

C (20 ohm) **B1**

Answer: C) 20 ohm

Question 70

A (15 m/s) **B1**

Answer: A) 15 m/s

Question 71

B (allows current to flow in one direction only) **B1**

Answer: B) allows current to flow in one direction only

Question 72

D (glass) **B1**

Answer: D) glass

Question 73

C (wood) **B1**

Answer: C) wood

Question 74

30 ohm (oe) **B1**

Answer: 30 ohm

Question 75

E (1.5 A) **B1**

Answer: E) 1.5 A

Question 76

A (75 p) **B1**

Answer: A) 75 p

Question 77

D (1 A) **B1**

Answer: D) 1 A

Question 78

E (340 m/s) **B1**

Answer: E) 340 m/s

Question 79

D (variable resistor) **B1**

Answer: D) variable resistor

Question 80

C (silver) **B1**

Answer: C) silver

Question 81

E (brass) **B1**

Answer: E) brass

Question 82

20 ohm (oe) **B1**

Answer: 20 ohm

Question 83

C (3 A) **B1**

Answer: C) 3 A

Question 84

A (0.8 kWh) **B1**

Answer: A) 0.8 kWh

Question 85

B (10 V) **B1**

Answer: B) 10 V

Question 86

D (fuse) **B1**

Answer: D) fuse

Question 87

B (rubber) **B1**

Answer: B) rubber

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Question 88

correct substitution into V = I x R (0.4 x 15) **M1**

V = 6 V, cao **A1**

Answer: 6 V

Question 89

E (cobalt) **B1**

Answer: E) cobalt

Question 90

2 ohm (oe) **B1**

Answer: 2 ohm

Question 91

A (4.5 V) **B1**

Answer: A) 4.5 V

Question 92

E (4 kWh) **B1**

Answer: E) 4 kWh

Question 93

A (10 m/s) **B1**

Answer: A) 10 m/s

Question 94

C (has a resistance that falls as the temperature rises) **B1**

Answer: C) has a resistance that falls as the temperature rises

Question 95

D (graphite) **B1**

Answer: D) graphite

Question 96

C (gold) **B1**

Answer: C) gold

Question 97

90% (oe) **B1**

Answer: 90%

Question 98

(a) R = 5 + 7 = 12 ohm **B1**

(a) Answer: 12 ohm

(b) V = I x R = 2 x 7 **M1**

(b) 14 V, cao **A1**

(b) Answer: 14 V

(c) V = I x R(total) = 2 x 12 = 24 V, ft from (a) **B1**

(c) Answer: 24 V

Question 99

B (0.8 A) **B1**

Answer: B) 0.8 A

Question 100

D (60 V) **B1**

Answer: D) 60 V

Question 101

A (3 Hz) **B1**

Answer: A) 3 Hz

Question 102

E (light-dependent resistor) **B1**

Answer: E) light-dependent resistor

Question 103

D (dry wood) **B1**

Answer: D) dry wood

Question 104

C (silver) **B1**

Answer: C) silver

Question 105

Parallel (oe) **B1**

Answer: Parallel

Question 106

D (1.3 A) **B1**

Answer: D) 1.3 A

Question 107

(a) 1/R = 1/6 + 1/3 **M1**

(a) R = 2 ohm, cao **A1**

(a) Answer: 2 ohm

(b) I = V / R = 12 / 2 **M1**

(b) I = 6 A, cao **A1**

(b) Answer: 6 A

Question 108

E (20 ohm) **B1**

Answer: E) 20 ohm

Question 109

A (12 m/s) **B1**

Answer: A) 12 m/s

Question 110

E (has a resistance that falls as the light gets brighter) **B1**

Answer: E) has a resistance that falls as the light gets brighter

Question 111

D (plastic) **B1**

Answer: D) plastic

Question 112

C (copper) **B1**

Answer: C) copper

Question 113

50 degrees (oe) **B1**

Answer: 50 degrees

Question 114

B (12.5 kWh) **B1**

Answer: B) 12.5 kWh

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Question 115

D (5 A) **B1**

Answer: D) 5 A

Question 116

A (340 m/s) **B1**

Answer: A) 340 m/s

Question 117

B (ammeter) **B1**

Answer: B) ammeter

Question 118

D (cotton cloth) **B1**

Answer: D) cotton cloth

Question 119

E (plastic) **B1**

Answer: E) plastic

Question 120

A (2.2 A) **B1**

Answer: A) 2.2 A

Question 121

C (3 kWh) **B1**

Answer: C) 3 kWh

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