AME CET Technical Aptitude

Sample Paper – 6

Duration: 30 Minutes **Maximum Marks: 120**

Instructions

- This paper contains **30** Multiple Choice Questions (Single Correct Answer), covering **Mechanical & Applied-Physics Aptitude** (Q1–15) and **Electrical, Electronics & Aviation Technical Fundamentals** (Q16–30), in the **AME CET** marking style.
- Each correct answer carries **+4 marks**. Each wrong answer carries -1 **mark**. Unattempted questions carry **0 marks**.
- Only **one** option is correct per question. Choose carefully.
- This is a **supplementary technical-aptitude practice set** for AME CET aspirants; pacing is one minute per question, matching the main exam.
- Use of mobile phones, calculators, or any electronic gadget is strictly prohibited.

Part A: Mechanical & Applied-Physics Aptitude

Q1. A braking force of 12 N acts opposite to the motion of a body of mass 3 kg. The retardation (magnitude of deceleration) produced is:

(A) 36 m/s^2

(B) 0.25 m/s^2

(C) 4 m/s^2

(D) 15 m/s^2

Q2. A 2 kg ball moving at 6 m/s strikes and sticks to a stationary 4 kg ball. By conservation of momentum, the common velocity of the combined mass just after impact is:

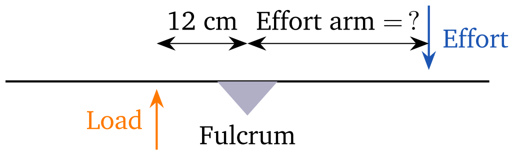
(A) 3 m/s

(B) 2 m/s

(C) 12 m/s

(D) 6 m/s

Q3. For the class-1 lever shown, the ideal mechanical advantage is 5 and the load arm is 12 cm. The effort arm must be:



(A) 2.4 cm

(B) 17 cm

(C) 7 cm

(D) 60 cm

Q4. A constant force of 25 N acts on a body over a displacement of 8 m, so the force–distance graph is a rectangle. The work done, equal to the area under the graph, is:

(A) 200 J

(B) 33 J

(C) 3.125 J

(D) 17 J

Q5. A pump lifts 300 kg of water through a height of 5 m in 10 seconds. Taking $g = 10$ m/s^2, the power output of the pump is:

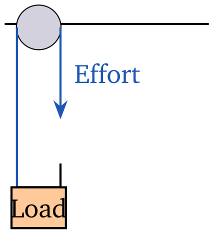
(A) 150 W

(B) 1500 W

(C) 15000 W

(D) 60 W

Q6. For the single movable pulley system shown (ideal, weightless and frictionless), the velocity ratio is equal to the number of rope segments supporting the load. That value is:



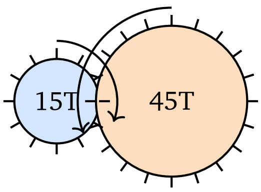
(A) 1

(B) 4

(C) 2

(D) 0.5

Q7. Two external gears mesh as shown. The driver has 15 teeth and the driven has 45 teeth. The driven gear turns in the opposite sense to the driver and, if the driver runs at 600 rpm, the driven gear runs at:



(A) 200 rpm, opposite direction

(B) 1800 rpm, same direction

(C) 600 rpm, opposite direction

(D) 45 rpm, same direction

Q8. A wire carries a tensile force of 600 N and the stress developed in it is 3×10^6 Pa. The cross-sectional area of the wire is:

(A) 5×10^{-3} m^2

(B) 2×10^{-4} m^2

(C) 2×10^4 m^2

(D) 1.8×10^9 m^2

Q9. The property of a material that allows it to absorb energy and deform plastically before fracturing is called:

(A) Brittleness

(B) Density

(C) Conductivity

(D) Toughness

Q10. The SI unit of electric charge is the:

(A) Volt

(B) Ampere

(C) Coulomb

(D) Ohm

Q11. Standard atmospheric pressure is approximately equal to:

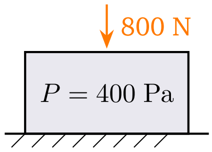
(A) 1.0×10^5 Pa

(B) 1.0×10^2 Pa

(C) 1.0×10^8 Pa

(D) 760 Pa

Q12. A block exerts a downward force of 800 N on the ground and produces a pressure of 400 Pa, as shown. The area of contact with the ground is:



(A) 0.5 m^2

(B) 2 m^2

(C) 320000 m^2

(D) 1200 m^2

Q13. A fully submerged object displaces 3 kg of water. Taking the density of water as 1000 kg/m^3, the volume of the object is:

(A) 3000 m^3

(B) 0.3 m^3

(C) 30 m^3

(D) 0.003 m^3

Q14. Supplying 9000 J of heat raises the temperature of a 3 kg metal block by 10 °C. The specific heat capacity of the metal is:

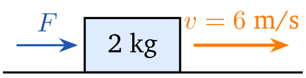
(A) 300 J/kg· °C

(B) 30 J/kg· °C

(C) 270000 J/kg· °C

(D) 900 J/kg· °C

Q15. A 2 kg block initially at rest is pushed along a smooth floor by a constant net force, as shown, and reaches a speed of 6 m/s. By the work–energy theorem, the work done by the net force equals the gain in kinetic energy, which is:



(A) 12 J

(B) 72 J

(C) 36 J

(D) 6 J

Part B: Electrical, Electronics & Aviation Technical Fundamentals

Q16. A voltage of 24 V is applied across a resistor and a current of 4 A flows through it. The resistance of the resistor is:

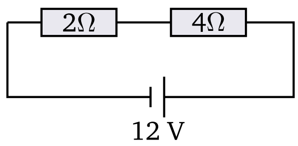
(A) 96 Ω

(B) 28 Ω

(C) 20 Ω

(D) 6 Ω

Q17. In the series circuit shown, a 12 V battery drives current through a 2 Ω and a 4 Ω resistor. The voltage across the 4 Ω resistor is:



(A) 4 V

(B) 8 V

(C) 12 V

(D) 6 V

Q18. A 12 Ω resistor is connected in parallel with a 6 Ω resistor. Their combined resistance is:

(A) 4 Ω

(B) 18 Ω

(C) 9 Ω

(D) 2 Ω

Q19. An electric bulb operating on a 220 V supply draws a current of 0.5 A. Its power rating is:

(A) 44 W

(B) 440 W

(C) 110 W

(D) 220.5 W

Q20. A real cell of EMF 2 V has an internal resistance. When it supplies current to an external circuit, its terminal voltage is found to be 1.8 V. The 0.2 V difference is accounted for by the:

(A) EMF of a second cell

(B) capacitance of the wires

(C) resistance of the ammeter only

(D) voltage drop across the cell's internal resistance

Q21. The electrical device that converts direct current (DC) into alternating current (AC) is the:

(A) Rectifier

(B) Inverter

(C) Transformer

(D) Battery

Q22. A straight current-carrying conductor placed in a magnetic field experiences a force. This effect is the working principle of the:

(A) transformer

(B) capacitor

(C) electric motor

(D) simple cell

Q23. In an electronic circuit, the component whose main function is to store electric charge is the:

(A) capacitor

(B) resistor

(C) diode

(D) fuse

Q24. Which of the following sources supplies direct current (DC), flowing steadily in one direction?

(A) Domestic wall socket (mains)

(B) Dry cell / battery

(C) AC alternator

(D) Power-station turbine output

Q25. The cockpit instrument that indicates the rate at which the aircraft is turning (rate of turn) is the:

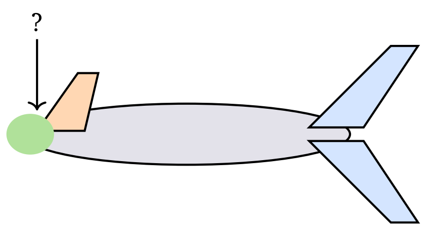
(A) Altimeter

(B) Airspeed indicator

(C) Tachometer

(D) Turn coordinator

Q26. In the simplified aircraft outline shown, the marked forward compartment from which the pilots fly and monitor the aircraft is called the:



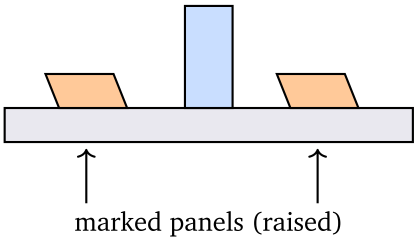
(A) Cockpit (flight deck)

(B) Empennage

(C) Aileron

(D) Nacelle

Q27. The flat panels marked on the upper surface of the wings in the figure pop up to disrupt airflow, reduce lift and increase drag, especially after touchdown. These surfaces are the:



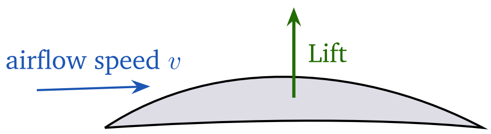
(A) Ailerons

(B) Spoilers

(C) Rudder

(D) Elevator

Q28. Air flows over the aerofoil shown. For a given aerofoil at a fixed angle of attack, the lift it generates increases with both the wing area and the:



(A) cube of the airspeed

(B) reciprocal of the airspeed

(C) square of the airspeed

(D) colour of the wing

Q29. In straight flight, an aircraft will begin to descend (lose height) when:

(A) lift exactly equals weight

(B) the lift becomes less than the weight

(C) thrust exactly equals drag

(D) the thrust becomes greater than the drag

Q30. The aircraft system whose job is to prevent or remove the build-up of ice on wings, propellers and other surfaces is the:

(A) De-icing / anti-icing system

(B) Fuel system

(C) Oxygen system

(D) Ignition system

Detailed Solutions

Q1.

Solution

Concept — Newton's second law: The magnitude of acceleration (or retardation) equals the net force divided by the mass, $a = F/m$.

Step 1 — Write the formula:

$$a = \frac{F}{m}$$

Step 2 — Substitute the values $F = 12$ N and $m = 3$ kg:

$$a = \frac{12}{3}$$

Step 3 — Simplify:

$$a = 4 \text{ m/s}^2$$

Step 4 — Interpret: Because the force opposes the motion, this is a retardation of magnitude 4 m/s^2.

Why other options are wrong:

- Option A (36): multiplies force by mass instead of dividing.
- Option B (0.25): divides mass by force, inverting the formula.
- Option D (15): adds force and mass, which is dimensionally invalid.

Final Answer: 4 m/s^2 $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q1

Q2.

Solution

Concept — Conservation of momentum (perfectly inelastic collision): When two bodies stick together, the total momentum before equals the total momentum after, and they move with a common velocity.

Step 1 — Write the conservation equation:

$$m_1 u_1 + m_2 u_2 = (m_1 + m_2)\, v$$

Step 2 — Substitute $m_1 = 2$ kg, $u_1 = 6$ m/s, $m_2 = 4$ kg, $u_2 = 0$:

$$(2)(6) + (4)(0) = (2+4)\,v$$

Step 3 — Compute the left side:

$$12 = 6\,v$$

Step 4 — Solve for v:

$$v = \frac{12}{6} = 2 \text{ m/s}$$

Why other options are wrong:

- Option A (3): divides the initial momentum by 4 instead of 6.
- Option C (12): reports the momentum value, not the velocity.
- Option D (6): keeps the original velocity, ignoring the added mass.

Final Answer: 2 m/s ⇒ $\boxed{\text{B}}$

Answer: (B) Go Back to Q2

Q3.

Solution

Concept — Mechanical advantage of a lever: For an ideal lever, MA = effort arm ÷ load arm, so the effort arm = MA × load arm.

Step 1 — Rearrange the formula:

$$\text{effort arm} = \text{MA} \times \text{load arm}$$

Step 2 — Substitute MA $= 5$ and load arm $= 12$ cm:

$$\text{effort arm} = 5 \times 12$$

Step 3 — Simplify:

$$\text{effort arm} = 60 \text{ cm}$$

Why other options are wrong:

- Option A (2.4): divides the load arm by MA instead of multiplying.

- Option B (17): adds MA and the load arm.
- Option C (7): subtracts MA from the load arm.

Final Answer: 60 cm $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q3

Q4.

Solution

Concept — Work as area under a force–distance graph: For a constant force the graph is a rectangle, and its area (force $\times$ distance) equals the work done.

Step 1 — Write the formula:

$$W = F \times d$$

Step 2 — Substitute $F = 25$ N and $d = 8$ m:

$$W = 25 \times 8$$

Step 3 — Simplify:

$$W = 200 \text{ J}$$

Why other options are wrong:

- Option B (33): adds force and distance.
- Option C (3.125): divides force by distance.
- Option D (17): subtracts distance from force.

Final Answer: 200 J $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q4

Q5.

Solution

Concept — Power of a pump: The pump raises water against gravity, so the work done is mgh and the power is that work divided by the time, $P = mgh/t$.

Step 1 — Write the formula:

$$P = \frac{mgh}{t}$$

Step 2 — Substitute $m = 300$ **kg,** $g = 10$ **m/s^2,** $h = 5$ **m,** $t = 10$ **s:**

$$P = \frac{300 \times 10 \times 5}{10}$$

Step 3 — Evaluate the numerator:

$$300 \times 10 \times 5 = 15000$$

Step 4 — Divide by the time:

$$P = \frac{15000}{10} = 1500 \text{ W}$$

Why other options are wrong:

- Option A (150): divides by an extra factor of ten.
- Option C (15000): forgets to divide by the time.
- Option D (60): omits g and mis-handles the numbers.

Final Answer: 1500 W $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Velocity ratio of a single movable pulley: For a single movable pulley the load is supported by two segments of rope, so both the velocity ratio and the ideal mechanical advantage equal 2.

Step 1 — Count the supporting rope segments: Two segments of rope support the movable pulley and its load.

Step 2 — State the velocity ratio:

$$\text{Velocity ratio} = \text{number of supporting segments} = 2$$

Why other options are wrong:

- Option A (1): that is the value for a single fixed pulley.
- Option B (4): that needs two movable pulleys (four segments).
- Option D (0.5): inverts the ratio.

Final Answer: $2 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q6

Q7.

Solution

Concept — Gear speed ratio and direction: For two meshing external gears, speed is inversely proportional to the number of teeth, and the two gears turn in opposite directions.

Step 1 — Write the relation:

$$N_{\text{driven}} = N_{\text{driver}} \times \frac{T_{\text{driver}}}{T_{\text{driven}}}$$

Step 2 — Substitute $N_{\text{driver}} = 600$ rpm, $T_{\text{driver}} = 15$, $T_{\text{driven}} = 45$:

$$N_{\text{driven}} = 600 \times \frac{15}{45}$$

Step 3 — Simplify the fraction:

$$\frac{15}{45} = \frac{1}{3}$$

Step 4 — Compute:

$$N_{\text{driven}} = 600 \times \frac{1}{3} = 200 \text{ rpm}$$

Step 5 — Decide the direction: Two externally meshing gears always rotate in opposite directions.

Why other options are wrong:

- Option B (1800, same direction): multiplies by 3 and gives the wrong sense of rotation.
- Option C (600, opposite): ignores the tooth ratio.
- Option D (45, same direction): uses the tooth count as the speed and the wrong direction.

Final Answer: 200 rpm, opposite direction $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q7

Q8.

Solution

Concept — Stress: Stress is force per unit area, $\sigma = F/A$, so the area is $A = F/\sigma$.

Step 1 — Rearrange the formula:

$$A = \frac{F}{\sigma}$$

Step 2 — Substitute $F = 600$ N and $\sigma = 3 \times 10^6$ Pa:

$$A = \frac{600}{3 \times 10^6}$$

Step 3 — Divide the numbers:

$$\frac{600}{3} = 200$$

Step 4 — Apply the power of ten:

$$A = \frac{200}{10^6} = 2 \times 10^{-4}\ \text{m}^2$$

Why other options are wrong:

- Option A (5×10^{-3}): wrong division of the numbers.
- Option C (2×10^4): uses the wrong sign on the exponent.
- Option D (1.8×10^9): multiplies force by stress instead of dividing.

Final Answer: $2 \times 10^{-4}\ \text{m}^2 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q8

Q9.

Solution

Concept — Mechanical properties of materials: Toughness is the ability of a material to absorb energy and deform plastically before it fractures.

Step 1 — Match the definition: "Absorbs energy and deforms before fracturing" is exactly the description of toughness.

Step 2 — Confirm the property: Tough materials, such as mild steel, can take impact and bending without snapping suddenly.

Why other options are wrong:

- Option A (Brittleness): brittle materials break suddenly with little energy absorbed.
- Option B (Density): mass per unit volume, unrelated to energy absorption.
- Option C (Conductivity): the ability to carry heat or current, not energy absorption.

Final Answer: Toughness $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q9

Q10.

Solution

Concept — SI units: Electric charge is measured in coulombs (C); one coulomb is the charge carried by a current of one ampere flowing for one second.

Step 1 — Recall the defining relation:

$$\text{Charge} = \text{Current} \times \text{Time}, \qquad 1\ \text{C} = 1\ \text{A} \cdot \text{s}$$

Step 2 — Name the unit: The SI unit of electric charge is the coulomb.

Why other options are wrong:

- Option A (Volt): the unit of potential difference.
- Option B (Ampere): the unit of electric current.
- Option D (Ohm): the unit of resistance.

Final Answer: Coulomb $\Rightarrow \boxed{C}$

Answer: (C) Go Back to Q10

Q11.

Solution

Concept — Atmospheric pressure: Standard atmospheric pressure at sea level is about 101325 Pa, which rounds to 1.0×10^5 Pa.

Step 1 — Recall the standard value:

$$1\ \text{atm} \approx 101325\ \text{Pa}$$

Step 2 — Round to one significant figure:

$$101325 \approx 1.0 \times 10^5 \text{ Pa}$$

Why other options are wrong:

- Option B (1.0×10^2): far too small, only about 100 Pa.
- Option C (1.0×10^8): a thousand times too large.
- Option D (760): that is the height of the mercury column in mm, not the pressure in pascals.

Final Answer: 1.0×10^5 Pa $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q11

Q12.

Solution

Concept — Pressure: Pressure is force per unit area, $P = F/A$, so the area is $A = F/P$.

Step 1 — Rearrange the formula:

$$A = \frac{F}{P}$$

Step 2 — Substitute $F = 800$ N and $P = 400$ Pa:

$$A = \frac{800}{400}$$

Step 3 — Simplify:

$$A = 2 \text{ m}^2$$

Why other options are wrong:

- Option A (0.5): inverts the ratio, dividing P by F.
- Option C (320000): multiplies force by pressure instead of dividing.
- Option D (1200): adds force and pressure.

Final Answer: $2 \text{ m}^2 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q12

Q13.

Solution

Concept — Density and volume: Density is mass per unit volume, $\rho = m/V$, so the volume is $V = m/\rho$.

Step 1 — Rearrange the formula:

$$V = \frac{m}{\rho}$$

Step 2 — Substitute $m = 3$ kg and $\rho = 1000$ kg/m^3:

$$V = \frac{3}{1000}$$

Step 3 — Simplify:

$$V = 0.003 \text{ m}^3$$

Why other options are wrong:

- Option A (3000): multiplies mass by density instead of dividing.
- Option B (0.3): off by a factor of one hundred in the decimal.
- Option C (30): off by a factor of ten thousand.

Final Answer: 0.003 m^3 $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) **Go Back to Q13**

Q14.

Solution

Concept — Specific heat capacity: The heat supplied is $Q = mc\Delta T$, so the specific heat is $c = Q/(m\,\Delta T)$.

Step 1 — Rearrange the formula:

$$c = \frac{Q}{m\,\Delta T}$$

Step 2 — Substitute $Q = 9000$ J, $m = 3$ kg, $\Delta T = 10\,°$C:

$$c = \frac{9000}{3 \times 10}$$

Step 3 — Evaluate the denominator:

$$3 \times 10 = 30$$

Step 4 — Divide:

$$c = \frac{9000}{30} = 300 \text{ J/kg} \cdot {}^\circ\text{C}$$

Why other options are wrong:

- Option B (30): divides by an extra factor of ten.
- Option C (270000): multiplies all three quantities instead of dividing.
- Option D (900): forgets to multiply the mass by ΔT.

Final Answer: 300 J/kg$\cdot$ °C $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q14

Q15.

Solution

Concept — Work–energy theorem: The work done by the net force equals the change in kinetic energy. Starting from rest, this equals the final kinetic energy $\frac{1}{2}mv^2$.

Step 1 — Write the theorem:

$$W_{\text{net}} = \Delta\text{KE} = \tfrac{1}{2}mv^2 - 0$$

Step 2 — Substitute $m = 2$ kg and $v = 6$ m/s:

$$W_{\text{net}} = \frac{1}{2} \times 2 \times (6)^2$$

Step 3 — Evaluate the square:

$$(6)^2 = 36$$

Step 4 — Compute:

$$W_{\text{net}} = \frac{1}{2} \times 2 \times 36 = 1 \times 36 = 36 \text{ J}$$

Why other options are wrong:

- Option A (12): forgets to square the velocity.
- Option B (72): omits the factor of one-half.
- Option D (6): uses the velocity value directly as the energy.

Final Answer: 36 J $\Rightarrow$ C

Answer: (C) Go Back to Q15

Q16.

Solution

Concept — Ohm's law: The resistance equals the voltage divided by the current, $R = V/I$.

Step 1 — Write the formula:

$$R = \frac{V}{I}$$

Step 2 — Substitute $V = 24$ V and $I = 4$ A:

$$R = \frac{24}{4}$$

Step 3 — Simplify:

$$R = 6\ \Omega$$

Why other options are wrong:

- Option A (96): multiplies voltage by current.
- Option B (28): adds voltage and current.
- Option C (20): subtracts current from voltage.

Final Answer: $6\ \Omega \Rightarrow$ D

Answer: (D) Go Back to Q16

Q17.

Solution

Concept — Voltage division in a series circuit: The same current flows through series resistors; first find that current, then the voltage across each resistor is $V = IR$.

Step 1 — Find the total resistance:

$$R_{\text{total}} = 2 + 4 = 6\ \Omega$$

Step 2 — Find the circuit current:

$$I = \frac{V}{R_{\text{total}}} = \frac{12}{6} = 2\ \text{A}$$

Step 3 — Find the voltage across the 4 Ω resistor:

$$V_4 = I \times 4 = 2 \times 4$$

Step 4 — Simplify:

$$V_4 = 8\ \text{V}$$

Why other options are wrong:

- Option A (4): this is the voltage across the 2 Ω resistor.
- Option C (12): the full battery voltage, not the share across one resistor.
- Option D (6): assumes the voltage splits equally, ignoring the unequal resistances.

Final Answer: 8 V $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q17

Q18.

Solution

Concept — Two resistors in parallel: For two resistors in parallel, the combined resistance is the product divided by the sum, $R_p = \dfrac{R_1 R_2}{R_1 + R_2}$.

Step 1 — Write the product-over-sum formula:

$$R_p = \frac{R_1 R_2}{R_1 + R_2}$$

Step 2 — Substitute $R_1 = 12\ \Omega$ and $R_2 = 6\ \Omega$:

$$R_p = \frac{12 \times 6}{12 + 6}$$

Step 3 — Evaluate the numerator and denominator:

$$R_p = \frac{72}{18}$$

Step 4 — Divide:

$$R_p = 4\ \Omega$$

Why other options are wrong:

- Option B (18): adds the resistors as if in series.
- Option C (9): takes the simple average of the two values.
- Option D (2): an arithmetic slip in the division.

Final Answer: $4\ \Omega \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q18

Q19.

Solution

Concept — Electrical power: The power drawn by a device is the product of voltage and current, $P = VI$.

Step 1 — Write the formula:

$$P = VI$$

Step 2 — Substitute $V = 220$ V and $I = 0.5$ A:

$$P = 220 \times 0.5$$

Step 3 — Simplify:

$$P = 110\ \text{W}$$

Why other options are wrong:

- Option A (44): an incorrect multiplication.
- Option B (440): divides by the current instead of multiplying.
- Option D (220.5): adds voltage and current.

Final Answer: 110 W $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q19

Q20.

Solution

Concept — Terminal voltage of a real cell: A real cell has internal resistance r. When it delivers current I, some voltage is lost inside it, so the terminal voltage is $V = E - Ir$. The difference $E - V$ is the internal voltage drop.

Step 1 — Write the relation:

$$V = E - Ir$$

Step 2 — Identify the gap:

$$E - V = 2 - 1.8 = 0.2\text{ V}$$

Step 3 — Attribute the loss: This 0.2 V is the voltage dropped across the cell's own internal resistance as current flows.

Why other options are wrong:

- Option A (second cell): there is only one cell in the question.
- Option B (capacitance of wires): capacitance does not cause a steady voltage drop here.
- Option C (ammeter resistance only): the loss is inside the cell, not in the meter.

Final Answer: voltage drop across the cell's internal resistance $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q20

Q21.

Solution

Concept — Inverter: An inverter is the electronic device that converts direct current (DC) into alternating current (AC).

Step 1 — Identify the conversion required: Input is DC; the desired output is AC.

Step 2 — Match to the device: The device that performs DC $\rightarrow$ AC conversion is the inverter.

Why other options are wrong:

- Option A (Rectifier): does the reverse, AC $\rightarrow$ DC.
- Option C (Transformer): only changes AC voltage levels, it does not change DC into AC.
- Option D (Battery): stores and supplies DC energy, it does not produce AC.

Final Answer: Inverter $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q21

Q22.

Solution

Concept — Force on a current-carrying conductor: A conductor carrying current in a magnetic field experiences a force; this motor effect is what makes an electric motor turn.

Step 1 — Recall the motor effect: A current-carrying wire in a magnetic field feels a force at right angles to both the current and the field.

Step 2 — Match to the device: This force is harnessed to produce rotation in an electric motor.

Why other options are wrong:

- Option A (transformer): works by mutual induction, not by force on a wire.
- Option B (capacitor): stores charge; no force-on-current action.
- Option D (simple cell): a chemical source of EMF, unrelated to the motor effect.

Final Answer: electric motor $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q22

Q23.

Solution

Concept — Capacitor: A capacitor is the component whose main function is to store electric charge (and the associated electrical energy) between its plates.

Step 1 — Recall the function: A capacitor accumulates charge when a voltage is applied across it.

Step 2 — Match to the component: The charge-storing component in the list is the capacitor.

Why other options are wrong:

- Option B (resistor): limits or controls current, it does not store charge.
- Option C (diode): allows current in one direction only.
- Option D (fuse): protects a circuit by melting under excess current.

Final Answer: capacitor $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q23

Q24.

Solution

Concept — DC source: Direct current flows steadily in one direction. A dry cell or battery is a classic DC source, whereas mains and alternators give AC.

Step 1 — Recall what gives DC: A battery has a fixed positive and negative terminal, so current always flows the same way.

Step 2 — Select the matching source: The dry cell / battery supplies direct current.

Why other options are wrong:

- Option A (mains socket): supplies alternating current.
- Option C (AC alternator): produces alternating current by design.
- Option D (turbine output): drives an alternator, so its electrical output is AC.

Final Answer: Dry cell / battery $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q24

Q25.

Solution

Concept — Flight instruments: The turn coordinator shows the rate at which the aircraft is turning (rate of turn) and the quality of the turn.

Step 1 — Match the function to the instrument: Indicating how fast the aircraft is turning is the job of the turn coordinator.

Step 2 — Confirm the principle: It uses a gyroscope sensitive to the aircraft's rate of rotation about the vertical axis.

Why other options are wrong:

- Option A (Altimeter): shows height above sea level.
- Option B (Airspeed indicator): shows speed through the air.
- Option C (Tachometer): shows engine or rotor rpm.

Final Answer: Turn coordinator $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q25

Q26.

Solution

Concept — Aircraft structure: The cockpit (flight deck) is the forward compartment of the aircraft from which the pilots operate and monitor the aircraft.

Step 1 — Identify the marked part: The marked forward section housing the pilots is the cockpit.

Step 2 — Confirm its role: It contains the flight controls, instruments and displays used to fly the aircraft.

Why other options are wrong:

- Option B (Empennage): the tail assembly at the rear, not the front.
- Option C (Aileron): a small roll-control surface on the wing.
- Option D (Nacelle): the streamlined housing around an engine.

Final Answer: Cockpit (flight deck) $\Rightarrow$ $\boxed{A}$

Answer: (A) Go Back to Q26

Q27.

Solution

Concept — Control surfaces: Spoilers are panels on the upper surface of the wing that rise to "spoil" the airflow, reducing lift and increasing drag, especially during descent and after landing.

Step 1 — Identify the effect described: Disrupting airflow to reduce lift and add drag is the function of spoilers.

Step 2 — Match the surface: The raised upper-surface panels shown are the spoilers.

Why other options are wrong:

- Option A (Ailerons): control roll by changing lift unevenly, not by dumping lift on touchdown.
- Option C (Rudder): on the vertical tail, controls yaw.
- Option D (Elevator): on the horizontal tail, controls pitch.

Final Answer: Spoilers $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q27

Q28.

Solution

Concept — Factors affecting lift: For a given aerofoil at a fixed angle of attack, lift increases with the wing area and with the square of the airspeed (lift $\propto v^2$).

Step 1 — Recall the lift relationship:

$$\text{Lift} \propto \frac{1}{2}\rho v^2 A$$

Step 2 — Identify the speed dependence: The airspeed appears as v^2, so lift grows with the square of the airspeed.

Why other options are wrong:

- Option A (cube of airspeed): lift depends on v^2, not v^3.
- Option B (reciprocal of airspeed): faster flow gives more lift, not less.
- Option D (colour of the wing): colour has no effect on lift.

Final Answer: square of the airspeed $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q28

Q29.

Solution

Concept — Four forces of flight: Height is controlled by the balance of lift and weight. The aircraft descends when the upward lift can no longer support the downward weight.

Step 1 — Identify the vertical pair: Lift acts upward, weight acts downward.

Step 2 — State the descent condition: When lift becomes less than weight, the net force is downward and the aircraft loses height.

Why other options are wrong:

- Option A (lift equals weight): this is level flight, no climb or descent.
- Option C (thrust equals drag): this fixes speed, not height.
- Option D (thrust greater than drag): this causes acceleration, not a loss of height.

Final Answer: the lift becomes less than the weight $\Rightarrow \boxed{B}$

Answer: (B) Go Back to Q29

Q30.

Solution

Concept — De-icing / anti-icing system: This system prevents the formation of ice, or removes ice already formed, on wings, propellers, engine inlets and other critical surfaces.

Step 1 — Identify the hazard addressed: Ice on lifting and control surfaces spoils their shape and is dangerous in flight.

Step 2 — Match to the system: The system that keeps these surfaces free of ice is the de-icing / anti-icing system.

Why other options are wrong:

- Option B (Fuel system): stores and delivers fuel to the engines.
- Option C (Oxygen system): supplies breathing oxygen at high altitude.
- Option D (Ignition system): starts and sustains combustion in the engine.

Final Answer: De-icing / anti-icing system $\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q30

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	B	3	D	4	A	5	B
6	C	7	A	8	B	9	D	10	C
11	A	12	B	13	D	14	A	15	C
16	D	17	B	18	A	19	C	20	D
21	B	22	C	23	A	24	B	25	D
26	A	27	B	28	C	29	B	30	A