

AME CET Technical Aptitude

Sample Paper – 3

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.

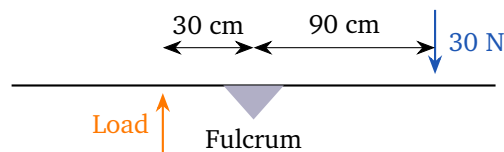
Part A: Mechanical & Applied-Physics Aptitude

- Q1.** A net force of 24 N produces an acceleration of 3 m/s^2 in a body. The mass of the body is:
- (A) 72 kg
(B) 27 kg
(C) 8 kg
(D) 21 kg
- Q2.** A ball of mass 0.5 kg moving at 6 m/s is brought to rest. The magnitude of the change in its momentum is:
- (A) 3 kg·m/s



- (B) $12 \text{ kg}\cdot\text{m}/\text{s}$
- (C) $6.5 \text{ kg}\cdot\text{m}/\text{s}$
- (D) $0.083 \text{ kg}\cdot\text{m}/\text{s}$

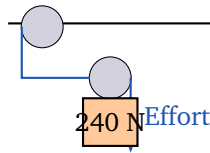
Q3. In the class-1 lever shown, an effort of 30 N is applied. The effort arm is 90 cm and the load arm is 30 cm. The maximum load that can be balanced is:



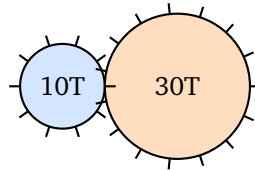
- (A) 10 N
 - (B) 120 N
 - (C) 60 N
 - (D) 90 N
- Q4.** A force of 40 N pulls a sledge, and the component of the force along the direction of motion is 40 N. The sledge moves 6 m. The work done is:
- (A) 46 J
 - (B) 240 J
 - (C) 6.7 J
 - (D) 34 J
- Q5.** A crane lifts a 50 kg load to a height of 6 m in 10 s. Taking $g = 10 \text{ m}/\text{s}^2$, the power developed is:
- (A) 30 W
 - (B) 3000 W
 - (C) 300 W
 - (D) 60 W



- Q6.** In the ideal pulley system shown (two movable pulleys), the mechanical advantage is 4. The effort needed to lift a load of 240 N is:



- (A) 60 N
(B) 960 N
(C) 240 N
(D) 120 N
- Q7.** A driver gear with 10 teeth meshes with a driven gear of 30 teeth, as shown. If the driver gear rotates at 600 rpm, the driven gear rotates at:



- (A) 1800 rpm
(B) 30 rpm
(C) 600 rpm
(D) 200 rpm
- Q8.** A wire is subjected to a stress of 2×10^8 Pa and develops a strain of 0.001. The Young's modulus of the wire material is:
- (A) 2×10^5 Pa
(B) 2×10^{11} Pa
(C) 2×10^8 Pa
(D) 5×10^{-12} Pa
- Q9.** The property of a material by which it returns to its original shape after the removal of the deforming force is called:



- (A) Plasticity
- (B) Hardness
- (C) Elasticity
- (D) Brittleness

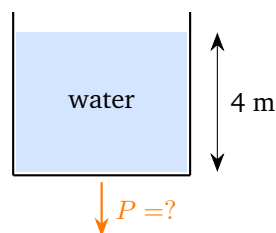
Q10. The SI unit of work (and of energy) is the:

- (A) Joule
- (B) Newton
- (C) Watt
- (D) Pascal

Q11. A car travels at a speed of 72 km/h. This speed expressed in m/s is:

- (A) 259.2 m/s
- (B) 7.2 m/s
- (C) 36 m/s
- (D) 20 m/s

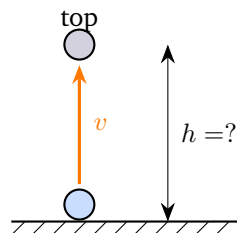
Q12. A tank is filled with water to a depth of 4 m, as shown. Taking the density of water as 1000 kg/m^3 and $g = 10 \text{ m/s}^2$, the pressure due to the water at the bottom of the tank is:



- (A) 400 Pa
- (B) 40000 Pa
- (C) 4000 Pa
- (D) 250 Pa



- Q13.** A metal has a density of 8000 kg/m^3 . Taking the density of water as 1000 kg/m^3 , the relative density (specific gravity) of the metal is:
- (A) 9000
(B) 0.125
(C) 8
(D) 8000
- Q14.** A temperature of 40°C , expressed on the Fahrenheit scale, is:
- (A) 40°F
(B) 72°F
(C) 313°F
(D) 104°F
- Q15.** A ball of mass 2 kg is thrown vertically upward with a kinetic energy of 100 J , as shown. Assuming no air resistance and $g = 10 \text{ m/s}^2$, the maximum height it reaches is:



- (A) 10 m
(B) 5 m
(C) 2.5 m
(D) 20 m

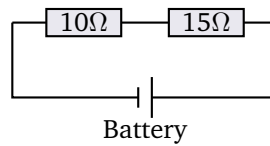
**Part B: Electrical, Electronics &
Aviation Technical Fundamentals**

- Q16.** A voltage of 12 V is applied across a resistor and a current of 3 A flows through it. The resistance of the resistor is:



- (A) 36Ω
- (B) 15Ω
- (C) 4Ω
- (D) 9Ω

Q17. Two resistors of 10Ω and 15Ω are connected in series, as shown. The total resistance of the circuit is:



- (A) 25Ω
- (B) 6Ω
- (C) 5Ω
- (D) 150Ω

Q18. Two resistors of 6Ω and 3Ω are connected in parallel. Their combined resistance is:

- (A) 9Ω
- (B) 4.5Ω
- (C) 18Ω
- (D) 2Ω

Q19. A 12 V supply is connected across a 6Ω resistor. The power dissipated in the resistor is:

- (A) 2 W
- (B) 24 W
- (C) 72 W
- (D) 48 W



- Q20.** Three identical cells, each of EMF 2 V, are connected in parallel. The EMF of the combination is:
- (A) 6 V
 - (B) 0.67 V
 - (C) 2 V
 - (D) 4 V
- Q21.** The electrical device used to step AC voltage up or down without changing its frequency is the:
- (A) Transformer
 - (B) Motor
 - (C) Battery
 - (D) Rectifier
- Q22.** The magnetic field produced around a long straight wire carrying a current is in the form of:
- (A) straight lines parallel to the wire
 - (B) concentric circles around the wire
 - (C) no magnetic field at all
 - (D) field lines pointing into the wire
- Q23.** The electronic circuit that converts alternating current (AC) into direct current (DC) is called a:
- (A) transformer
 - (B) amplifier
 - (C) oscillator
 - (D) rectifier
- Q24.** The standard frequency of the AC mains supply in India is:

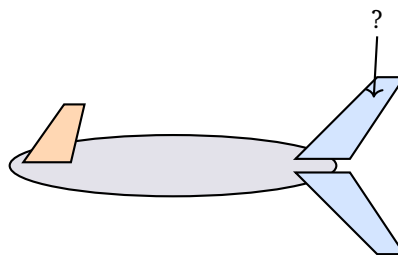


- (A) 220 Hz
- (B) 60 Hz
- (C) 50 Hz
- (D) 25 Hz

Q25. The cockpit instrument that indicates the direction (heading) in which an aircraft is pointing is the:

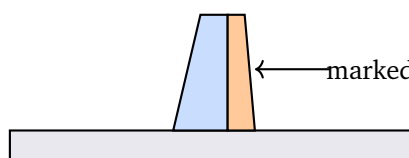
- (A) Altimeter
- (B) Airspeed indicator
- (C) Tachometer
- (D) Magnetic compass

Q26. In the simplified aircraft outline shown, the part marked with the arrow is the main surface that generates lift. This part is called the:



- (A) Wing
- (B) Fuselage
- (C) Rudder
- (D) Nacelle

Q27. The control surface marked on the vertical tail in the figure deflects to turn the aircraft's nose left or right about its vertical axis (yaw). This surface is the:



- (A) Aileron
- (B) Rudder
- (C) Elevator
- (D) Flap

Q28. Air flows past the aircraft body shown. The aerodynamic force that acts parallel to the airflow and opposes the forward motion of the aircraft is called:



- (A) Lift
- (B) Thrust
- (C) Drag
- (D) Weight

Q29. In level flight, the forward force produced by the engines is called thrust. The force that directly opposes thrust is:

- (A) Lift
- (B) Drag
- (C) Weight
- (D) Normal reaction

Q30. The aircraft system that uses high-pressure compressed air, often bled from the engines, to operate equipment such as air conditioning and engine starting is the:

- (A) Pneumatic system
- (B) Fuel system
- (C) Oxygen system
- (D) Ignition system



Detailed Solutions

Q1.

Solution

Concept — Newton's second law: Force equals mass times acceleration, $F = ma$, so the mass is $m = F/a$.

Step 1 — Rearrange the formula:

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

Step 2 — Substitute $F = 24 \text{ N}$ and $a = 3 \text{ m/s}^2$:

$$m = \frac{24}{3}$$

Step 3 — Simplify:

$$m = 8 \text{ kg}$$

Why other options are wrong:

- Option A (72): multiplies force by acceleration instead of dividing.
- Option B (27): adds force and acceleration.
- Option D (21): subtracts acceleration from force.

Final Answer: 8 kg \Rightarrow C

Answer: (C) [Go Back to Q1](#)

Q2.

Solution

Concept — Change in momentum: The change in momentum equals the final momentum minus the initial momentum, $\Delta p = mv_f - mv_i$.

Step 1 — Write the initial momentum:

$$p_i = mv_i = 0.5 \times 6 = 3 \text{ kg} \cdot \text{m/s}$$

Step 2 — Write the final momentum (brought to rest, $v_f = 0$):

$$p_f = mv_f = 0.5 \times 0 = 0$$



Step 3 — Find the magnitude of the change:

$$|\Delta p| = |p_f - p_i| = |0 - 3| = 3 \text{ kg} \cdot \text{m/s}$$

Why other options are wrong:

- Option B (12): multiplies by an extra factor and ignores the small mass.
- Option C (6.5): adds mass and velocity instead of multiplying.
- Option D (0.083): divides mass by velocity, inverting the formula.

Final Answer: $3 \text{ kg} \cdot \text{m/s} \Rightarrow \boxed{\text{A}}$

Answer: (A) [Go Back to Q2](#)

Q3.

Solution

Concept — Principle of moments for a lever: At balance, effort \times effort arm = load \times load arm, so load = effort \times (effort arm / load arm).

Step 1 — Write the balance condition:

$$\text{Load} = \text{Effort} \times \frac{\text{effort arm}}{\text{load arm}}$$

Step 2 — Substitute effort = 30 N, effort arm = 90 cm, load arm = 30 cm:

$$\text{Load} = 30 \times \frac{90}{30}$$

Step 3 — Simplify the ratio:

$$\frac{90}{30} = 3$$

Step 4 — Compute:

$$\text{Load} = 30 \times 3 = 90 \text{ N}$$

Why other options are wrong:

- Option A (10): divides effort by the arm ratio instead of multiplying.
- Option B (120): adds effort and load arm values.
- Option C (60): uses an arm ratio of 2 instead of 3.

Final Answer: $90 \text{ N} \Rightarrow \boxed{\text{D}}$



Answer: (D) [Go Back to Q3](#)

Q4.

Solution

Concept — Work done by a force: Work is the component of force along the motion multiplied by the distance moved.

Step 1 — Write the formula:

$$W = F_{\parallel} \times d$$

Step 2 — Substitute $F_{\parallel} = 40 \text{ N}$ and $d = 6 \text{ m}$:

$$W = 40 \times 6$$

Step 3 — Simplify:

$$W = 240 \text{ J}$$

Why other options are wrong:

- Option A (46): adds force and distance instead of multiplying.
- Option C (6.7): divides force by distance.
- Option D (34): subtracts distance from force.

Final Answer: 240 J \Rightarrow B

Answer: (B) [Go Back to Q4](#)

Q5.

Solution

Concept — Power in lifting: Power is the work done per unit time. Lifting a mass through a height does work mgh , so $P = mgh/t$.

Step 1 — Write the formula:

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

Step 2 — Substitute $m = 50 \text{ kg}$, $g = 10 \text{ m/s}^2$, $h = 6 \text{ m}$, $t = 10 \text{ s}$:

$$P = \frac{50 \times 10 \times 6}{10}$$



Step 3 — Multiply the numerator:

$$50 \times 10 \times 6 = 3000$$

Step 4 — Divide by the time:

$$P = \frac{3000}{10} = 300 \text{ W}$$

Why other options are wrong:

- Option A (30): divides by an extra factor of 10.
- Option B (3000): forgets to divide by the time.
- Option D (60): omits g from the calculation.

Final Answer: 300 W \Rightarrow C

Answer: (C) [Go Back to Q5](#)

Q6.

Solution

Concept — Pulley system with mechanical advantage: The effort equals the load divided by the mechanical advantage, $\text{Effort} = \text{Load} / \text{MA}$.

Step 1 — State the mechanical advantage:

$$\text{MA} = 4$$

Step 2 — Relate effort and load:

$$\text{Effort} = \frac{\text{Load}}{\text{MA}} = \frac{240}{4}$$

Step 3 — Simplify:

$$\text{Effort} = 60 \text{ N}$$

Why other options are wrong:

- Option B (960): multiplies the load by 4 instead of dividing.
- Option C (240): assumes no mechanical advantage.
- Option D (120): uses a mechanical advantage of 2 instead of 4.



Final Answer: 60 N \Rightarrow

Answer: (A) [Go Back to Q6](#)

Q7.

Solution

Concept — Gear speed ratio: For two meshing gears, speed is inversely proportional to the number of teeth: $N_{\text{driven}} = N_{\text{driver}} \times \frac{T_{\text{driver}}}{T_{\text{driven}}}$.

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, $T_{\text{driver}} = 10$, $T_{\text{driven}} = 30$:

$$N_{\text{driven}} = 600 \times \frac{10}{30}$$

Step 3 — Simplify the fraction:

$$\frac{10}{30} = \frac{1}{3}$$

Step 4 — Compute:

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

Why other options are wrong:

- Option A (1800): multiplies by 3 instead of dividing.
- Option B (30): uses the driven tooth count as the speed.
- Option C (600): assumes equal gears, ignoring the tooth ratio.

Final Answer: 200 rpm \Rightarrow

Answer: (D) [Go Back to Q7](#)



Q8.

Solution

Concept — Young's modulus: Young's modulus is the ratio of stress to strain,
 $E = \sigma/\varepsilon$.

Step 1 — Write the formula:

$$E = \frac{\sigma}{\varepsilon}$$

Step 2 — Substitute $\sigma = 2 \times 10^8$ Pa and $\varepsilon = 0.001$:

$$E = \frac{2 \times 10^8}{0.001}$$

Step 3 — Write the strain as a power of ten:

$$0.001 = 10^{-3}$$

Step 4 — Divide:

$$E = 2 \times 10^8 \times 10^3 = 2 \times 10^{11} \text{ Pa}$$

Why other options are wrong:

- Option A (2×10^5): multiplies by the strain instead of dividing.
- Option C (2×10^8): leaves the stress unchanged, ignoring the strain.
- Option D (5×10^{-12}): inverts the ratio (strain over stress).

Final Answer: 2×10^{11} Pa \Rightarrow

[Go Back to Q8](#)

Q9.

Solution

Concept — Elasticity: Elasticity is the property by which a material regains its original shape and size once the deforming force is removed.

Step 1 — Match the definition: “Returns to its original shape after the force is removed” is the defining description of elasticity.

Step 2 — Confirm the property: A stretched steel spring snapping back to its original length is a typical example of elastic behaviour.

Why other options are wrong:



- Option A (Plasticity): a plastic material keeps its new shape and does not return.
- Option B (Hardness): resistance to scratching or indentation, not shape recovery.
- Option D (Brittleness): a brittle material breaks rather than recovers its shape.

Final Answer: Elasticity \Rightarrow

Answer: (C) [Go Back to Q9](#)

Q10.

Solution

Concept — SI units: Work and energy share the same SI unit, the joule (J), defined as one newton-metre.

Step 1 — Recall the definition of work:

$$\text{Work} = \text{Force} \times \text{distance} = \text{N} \times \text{m}$$

Step 2 — Name the unit:

$$1 \text{ N} \cdot \text{m} = 1 \text{ joule (J)}$$

Why other options are wrong:

- Option B (Newton): the unit of force, not work.
- Option C (Watt): the unit of power (work per second).
- Option D (Pascal): the unit of pressure.

Final Answer: Joule \Rightarrow

Answer: (A) [Go Back to Q10](#)

Q11.

Solution

Concept — Speed unit conversion: To convert km/h to m/s, multiply by $\frac{1000}{3600}$, that is, divide by 3.6.



Step 1 — Write the conversion factor:

$$1 \text{ km/h} = \frac{1000 \text{ m}}{3600 \text{ s}} = \frac{1}{3.6} \text{ m/s}$$

Step 2 — Apply it to 72 km/h:

$$72 \text{ km/h} = \frac{72}{3.6} \text{ m/s}$$

Step 3 — Divide:

$$\frac{72}{3.6} = 20 \text{ m/s}$$

Why other options are wrong:

- Option A (259.2): multiplies by 3.6 instead of dividing.
- Option B (7.2): divides by 10 instead of 3.6.
- Option C (36): divides by 2 instead of 3.6.

Final Answer: 20 m/s \Rightarrow D

Answer: (D) [Go Back to Q11](#)

Q12.

Solution

Concept — Pressure due to a liquid column: The pressure at a depth h in a liquid is $P = \rho gh$.

Step 1 — Write the formula:

$$P = \rho gh$$

Step 2 — Substitute $\rho = 1000$, $g = 10$, $h = 4$:

$$P = 1000 \times 10 \times 4$$

Step 3 — Multiply step by step:

$$1000 \times 10 = 10000$$

$$10000 \times 4 = 40000 \text{ Pa}$$

Why other options are wrong:



- Option A (400): omits one factor of 100 from the density.
- Option C (4000): off by a factor of ten.
- Option D (250): divides instead of multiplying.

Final Answer: 40000 Pa \Rightarrow

Answer: (B) [Go Back to Q12](#)

Q13.

Solution

Concept — Relative density: Relative density (specific gravity) is the ratio of the density of a substance to the density of water.

Step 1 — Write the formula:

$$\text{Relative density} = \frac{\text{density of substance}}{\text{density of water}}$$

Step 2 — Substitute the densities:

$$\text{Relative density} = \frac{8000}{1000}$$

Step 3 — Simplify:

$$\text{Relative density} = 8$$

Why other options are wrong:

- Option A (9000): adds the two densities instead of dividing.
- Option B (0.125): inverts the ratio (water over metal).
- Option D (8000): forgets to divide by the density of water.

Final Answer: 8 \Rightarrow

Answer: (C) [Go Back to Q13](#)



Q14.

Solution

Concept — Celsius to Fahrenheit: The conversion formula is $F = \frac{9}{5}C + 32$.

Step 1 — Write the formula:

$$F = \frac{9}{5}C + 32$$

Step 2 — Substitute $C = 40$:

$$F = \frac{9}{5} \times 40 + 32$$

Step 3 — Evaluate the multiplication:

$$\frac{9}{5} \times 40 = 9 \times 8 = 72$$

Step 4 — Add 32:

$$F = 72 + 32 = 104^\circ\text{F}$$

Why other options are wrong:

- Option A (40): leaves the Celsius value unchanged.
- Option B (72): forgets to add the 32.
- Option C (313): uses the Kelvin conversion ($C + 273$) by mistake.

Final Answer: $104^\circ\text{F} \Rightarrow$

[Go Back to Q14](#)

Q15.

Solution

Concept — Conservation of energy: At the highest point the ball's kinetic energy has been fully converted into potential energy, so $\text{KE} = mgh$.

Step 1 — Equate kinetic and potential energy:

$$\text{KE} = mgh$$



Step 2 — Rearrange for the height:

$$h = \frac{KE}{mg}$$

Step 3 — Substitute $KE = 100 \text{ J}$, $m = 2 \text{ kg}$, $g = 10 \text{ m/s}^2$:

$$h = \frac{100}{2 \times 10}$$

Step 4 — Simplify:

$$h = \frac{100}{20} = 5 \text{ m}$$

Why other options are wrong:

- Option A (10): divides by m only, omitting g .
- Option C (2.5): divides by an extra factor of 2.
- Option D (20): divides by g only, omitting the mass.

Final Answer: 5 m \Rightarrow

[Go Back to Q15](#)

Q16.

Solution

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

Step 1 — Write the formula:

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

Step 2 — Substitute $V = 12 \text{ V}$ and $I = 3 \text{ A}$:

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

Step 3 — Simplify:

$$R = 4 \Omega$$

Why other options are wrong:

- Option A (36): multiplies voltage by current instead of dividing.



- Option B (15): adds voltage and current.
- Option D (9): subtracts current from voltage.

Final Answer: $4 \Omega \Rightarrow$ C

Answer: (C) [Go Back to Q16](#)

Q17.

Solution

Concept — Resistors in series: In a series circuit the total resistance is the sum of the individual resistances.

Step 1 — Write the formula:

$$R_{\text{total}} = R_1 + R_2$$

Step 2 — Substitute 10Ω and 15Ω :

$$R_{\text{total}} = 10 + 15$$

Step 3 — Add:

$$R_{\text{total}} = 25 \Omega$$

Why other options are wrong:

- Option B (6): uses the parallel combination of the two resistors.
- Option C (5): subtracts the resistances instead of adding.
- Option D (150): multiplies the resistances together.

Final Answer: $25 \Omega \Rightarrow$ A

Answer: (A) [Go Back to Q17](#)

Q18.

Solution

Concept — Two resistors in parallel: The combined resistance is the product over the sum, $R_p = \frac{R_1 R_2}{R_1 + R_2}$.



Step 1 — Write the formula:

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

Step 2 — Substitute $R_1 = 6 \Omega$ and $R_2 = 3 \Omega$:

$$R_p = \frac{6 \times 3}{6 + 3}$$

Step 3 — Evaluate numerator and denominator:

$$R_p = \frac{18}{9}$$

Step 4 — Simplify:

$$R_p = 2 \Omega$$

Why other options are wrong:

- Option A (9): adds the resistors as if in series.
- Option B (4.5): takes the simple average of the two values.
- Option C (18): gives only the product, not divided by the sum.

Final Answer: $2 \Omega \Rightarrow$ D

Answer: (D) [Go Back to Q18](#)

Q19.

Solution

Concept — Power dissipated in a resistor: When the voltage across a resistor is known, the power is $P = V^2/R$.

Step 1 — Write the formula:

$$P = \frac{V^2}{R}$$

Step 2 — Substitute $V = 12 \text{ V}$ and $R = 6 \Omega$:

$$P = \frac{(12)^2}{6}$$



Step 3 — Evaluate the square:

$$(12)^2 = 144$$

Step 4 — Divide:

$$P = \frac{144}{6} = 24 \text{ W}$$

Why other options are wrong:

- Option A (2): divides voltage by resistance without squaring.
- Option C (72): multiplies V^2 by R instead of dividing.
- Option D (48): squares only part of the voltage.

Final Answer: 24 W \Rightarrow

Answer: (B) [Go Back to Q19](#)

Q20.

Solution

Concept — Identical cells in parallel: When identical cells are connected in parallel, the EMF of the combination equals the EMF of a single cell (only the current capacity increases).

Step 1 — Recall the parallel rule:

$$E_{\text{total}} = E_{\text{single cell}}$$

Step 2 — Apply it to cells of 2 V each:

$$E_{\text{total}} = 2 \text{ V}$$

Why other options are wrong:

- Option A (6): adds the EMFs as if the cells were in series.
- Option B (0.67): divides the single EMF by the number of cells.
- Option D (4): adds only two of the cells.

Final Answer: 2 V \Rightarrow

Answer: (C) [Go Back to Q20](#)



Q21.

Solution

Concept — Transformer: A transformer uses mutual induction between two coils to step AC voltage up or down while keeping the frequency the same.

Step 1 — Identify the required function: The device must change the level of an AC voltage without altering its frequency.

Step 2 — Match to the device: This is exactly what a transformer does, using its primary and secondary windings.

Why other options are wrong:

- Option B (Motor): converts electrical energy into mechanical motion.
- Option C (Battery): stores chemical energy and supplies DC.
- Option D (Rectifier): converts AC into DC, it does not step voltage up or down.

Final Answer: Transformer \Rightarrow

[Go Back to Q21](#)

Q22.

Solution

Concept — Magnetic field of a straight wire: A current-carrying straight wire produces a magnetic field whose lines form concentric circles around the wire.

Step 1 — Recall the field pattern: The field lines encircle the wire, lying in planes perpendicular to it.

Step 2 — State the shape: These encircling lines are concentric circles centred on the wire.

Why other options are wrong:

- Option A (parallel lines): describes a uniform field, not that of a single wire.
- Option C (no field): a current always produces a magnetic field.
- Option D (into the wire): field lines circle the wire, they do not point into it.

Final Answer: concentric circles around the wire \Rightarrow

[Go Back to Q22](#)



Q23.

Solution

Concept — Rectifier: A rectifier is a circuit, usually built from diodes, that converts alternating current (AC) into direct current (DC).

Step 1 — Identify the conversion needed: The circuit must change AC into DC.

Step 2 — Match to the device: A diode rectifier passes current in one direction only, turning AC into pulsating DC.

Why other options are wrong:

- Option A (transformer): changes AC voltage level but keeps it as AC.
- Option B (amplifier): increases signal strength, it does not convert AC to DC.
- Option C (oscillator): generates AC signals rather than rectifying them.

Final Answer: rectifier \Rightarrow D

Answer: (D) [Go Back to Q23](#)

Q24.

Solution

Concept — Mains frequency in India: The domestic AC supply in India is standardised at 50 hertz, meaning the current completes 50 cycles each second.

Step 1 — Recall the standard: India uses a 230 V, 50 Hz single-phase mains supply.

Step 2 — Select the value: The frequency is therefore 50 Hz.

Why other options are wrong:

- Option A (220 Hz): confuses the voltage figure with the frequency.
- Option B (60 Hz): the standard used in the USA, not India.
- Option D (25 Hz): an old traction frequency, not the Indian mains value.

Final Answer: 50 Hz \Rightarrow C

Answer: (C) [Go Back to Q24](#)



Q25.

Solution

Concept — Flight instruments: The magnetic compass shows the aircraft's heading, that is, the direction in which its nose is pointing relative to magnetic north.

Step 1 — Match the function to the instrument: Indicating heading or direction is the job of the magnetic compass.

Step 2 — Confirm the principle: Its magnetised needle aligns with the Earth's magnetic field to show direction.

Why other options are wrong:

- Option A (Altimeter): shows height above sea level, not direction.
- Option B (Airspeed indicator): shows speed through the air.
- Option C (Tachometer): shows engine or rotor rotational speed.

Final Answer: Magnetic compass \Rightarrow

Answer: (D) [Go Back to Q25](#)

Q26.

Solution

Concept — Aircraft structure: The wing (mainplane) is the large aerofoil surface that generates most of the lift needed to keep the aircraft airborne.

Step 1 — Identify the marked part: The arrow points to the broad surface extending from the side of the body, which is the wing.

Step 2 — Confirm its role: As air flows over it, the wing produces lift, supporting the aircraft's weight.

Why other options are wrong:

- Option B (Fuselage): the central body, it does not generate the main lift.
- Option C (Rudder): a small control surface on the vertical tail.
- Option D (Nacelle): the streamlined housing around an engine.

Final Answer: Wing \Rightarrow

Answer: (A) [Go Back to Q26](#)



Q27.

Solution

Concept — Control surfaces: The rudder is a hinged surface on the vertical tail (fin) that swings left or right to yaw the aircraft about its vertical axis.

Step 1 — Identify the axis of motion: Turning the nose left or right is yaw, a rotation about the vertical axis.

Step 2 — Match the surface: The surface on the vertical tail that controls yaw is the rudder.

Why other options are wrong:

- Option A (Aileron): on the wings, controls roll.
- Option C (Elevator): on the horizontal tail, controls pitch.
- Option D (Flap): a high-lift device on the wing trailing edge, not a yaw control.

Final Answer: Rudder \Rightarrow

[Go Back to Q27](#)

Q28.

Solution

Concept — Drag: Drag is the aerodynamic force that acts parallel to the airflow and opposes the forward motion of the aircraft.

Step 1 — Note the direction of the force: The marked force points backward, against the direction of motion.

Step 2 — Identify the force: A force parallel to the airflow that resists forward motion is drag.

Why other options are wrong:

- Option A (Lift): acts perpendicular to the airflow, holding the aircraft up.
- Option B (Thrust): acts forward, in the direction of motion.
- Option D (Weight): acts vertically downward due to gravity.

Final Answer: Drag \Rightarrow

[Go Back to Q28](#)



Q29.

Solution

Concept — Four forces of flight: In level flight thrust acts forward and drag acts backward; these two horizontal forces directly oppose each other.

Step 1 — Identify the horizontal pair: Thrust pushes the aircraft forward; drag resists that motion.

Step 2 — State the opposing force: The force directly opposing thrust is therefore drag.

Why other options are wrong:

- Option A (Lift): a vertical force, balanced by weight, not thrust.
- Option C (Weight): a vertical force acting downward.
- Option D (Normal reaction): a ground-contact force, not present in steady flight.

Final Answer: Drag \Rightarrow

[Go Back to Q29](#)

Q30.

Solution

Concept — Aircraft pneumatic system: The pneumatic system uses high-pressure compressed air, frequently bled from the engine compressors, to run services such as air conditioning, pressurisation and engine starting.

Step 1 — Identify the working medium: The question specifies high-pressure compressed air bled from the engines.

Step 2 — Match to the system: A system driven by compressed air is the pneumatic system.

Why other options are wrong:

- Option B (Fuel system): stores and delivers fuel to the engines.
- Option C (Oxygen system): supplies breathing oxygen, not working air.
- Option D (Ignition system): provides the spark to start combustion.

Final Answer: Pneumatic system \Rightarrow

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Answer Key

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

