ALBERTA PHYS 126 · FULL COURSE · 50 QUESTIONS

Full Course — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **An object has mass 0.80 kg and volume 1.0×10^{-3} m³. Its density is**

- A 2.0×10^{2} kg/m³
- B 8.0×10^{2} kg/m³
- C 1.0×10^{3} kg/m³
- D 8.0×10^{1} kg/m³

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2 **A force of 600 N acts on an area of 0.030 m². The pressure is**

- A 2.0×10^{1} Pa
- B 2.0×10^{3} Pa
- C 2.0×10^{4} Pa
- D 2.0×10^{5} Pa

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3 **The gauge pressure at a depth of 5.0 m in water of density 1000 kg/m³ is**

- **A** 4.9×10^4 Pa
- **B** 4.9×10^3 Pa
- **C** 9.8×10^4 Pa
- **D** 1.0×10^3 Pa

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4 **In a hydraulic lift the input piston area is 0.0020 m² and the output area is 0.080 m². An input force of 50 N produces an output force of**

- **A** 50 N
- **B** 500 N
- **C** 1000 N
- **D** 2000 N

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5 **An object of volume 0.020 m^3 is fully submerged in water of density 1000 kg/m^3. The buoyant force on it is**

- **A** 19.6 N
- **B** 1.96× 10^2 N
- **C** 9.8× 10^2 N
- **D** 2.0× 10^3 N

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6 **Water flows at 1.5 m/s in a pipe of area 0.040 m^2 into a pipe of area 0.010 m^2. The speed in the narrower pipe is**

- **A** 1.5 m/s
- **B** 3.0 m/s
- **C** 6.0 m/s
- **D** 12 m/s

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7 In a horizontal pipe water of density 1000 kg/m³ speeds up from 2.0 m/s to 4.0 m/s. If the pressure at the slow section is 3.00×10^5 Pa, the pressure at the fast section is

- **A** 2.94×10^5 Pa
- **B** 3.06×10^5 Pa
- **C** 3.00×10^5 Pa
- **D** 2.40×10^5 Pa

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8 A block of density 600 kg/m³ floats in water of density 1000 kg/m³. The fraction of its volume submerged is

- **A** 0.10
- **B** 0.40
- **C** 1.00
- **D** 0.60

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9 **A gas contains 2.0 mol at 300 K in a volume of 0.050 m^3. Its pressure is closest to**

- **A** 5.0×10^4 Pa
- **B** 1.0×10^5 Pa
- **C** 2.0×10^5 Pa
- **D** 2.5×10^4 Pa

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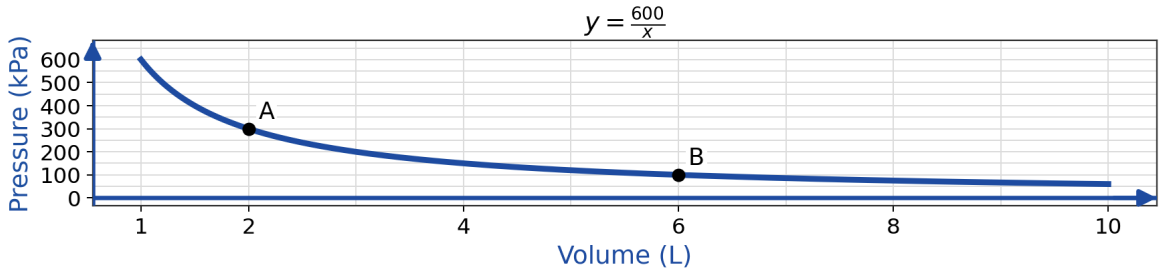
10 **The graph shows pressure against volume for a gas at constant temperature. The volume when the pressure is 300 kPa is**



- **A** 2 L
- **B** 6 L
- **C** 4 L
- **D** 10 L

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11 **The average kinetic energy of a gas molecule at 300 K is**

- **A** 2.07×10^{-21} J
- **B** 4.14×10^{-21} J
- **C** 6.21×10^{-21} J
- **D** 9.00×10^{-21} J

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12 For oxygen gas with molar mass 0.032 kg/mol at 300 K, the rms speed is closest to

- **A** 2.4×10^2 m/s
- **B** 3.4×10^2 m/s
- **C** 6.8×10^2 m/s
- **D** 4.8×10^2 m/s

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13 The temperature of a gas rises from 300 K to 600 K. The rms speed of its molecules increases by a factor of

- **A** 1.0
- **B** $\sqrt{2}$
- **C** 2
- **D** 4

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14 **A gas has pressure 2.0×10^{5} Pa, volume 0.030 m^3 and temperature 300 K. The amount of gas is**

- A 2.4 mol
- B 1.2 mol
- C 4.8 mol
- D 0.42 mol

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15 **A gas at constant pressure has volume 2.0 L at 300 K. Heated to 600 K, its volume is**

- A 1.0 L
- B 2.0 L
- C 4.0 L
- D 8.0 L

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16 **Two point charges of 2.0 μC and 3.0 μC are 0.30 m apart. The magnitude of the force between them is**

- **A** 0.060 N
- **B** 0.30 N
- **C** 1.2 N
- **D** 0.60 N

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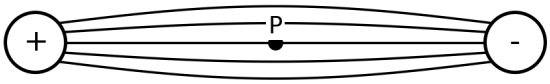
17 **The diagram shows two charges and point P. The direction of the electric field at P is**



- **A** Toward the left
- **B** Toward the right
- **C** Upward
- **D** Downward

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18 **A charge of 2.0 μC experiences a force of 0.040 N in an electric field. The field strength is**

- **A** 2.0×10^{4} N/C
- **B** 2.0×10^{3} N/C
- **C** 4.0×10^{4} N/C
- **D** 8.0×10^{4} N/C

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19 **The electric potential at a distance of 0.20 m from a point charge of 4.0 μC is**

- **A** 4.5×10^{4} V
- **B** 9.0×10^{4} V
- **C** 1.8×10^{5} V
- **D** 3.6×10^{5} V

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20 **A charge of 3.0 μC moves through a potential difference of 200 V. The work done on the charge is**

- A 6.0×10^{-6} J
- B 6.0×10^{-5} J
- C 6.0×10^{-3} J
- D 6.0×10^{-4} J

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21 **A capacitor stores a charge of 12 μC when the voltage across it is 6.0 V. Its capacitance is**

- A 0.50 μF
- B 2.0 μF
- C 12 μF
- D 72 μF

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22 **The energy stored in a 4.0 μF capacitor charged to 12 V is**

- **A** 2.88×10^{-4} J
- **B** 1.44×10^{-4} J
- **C** 5.76×10^{-4} J
- **D** 2.88×10^{-2} J

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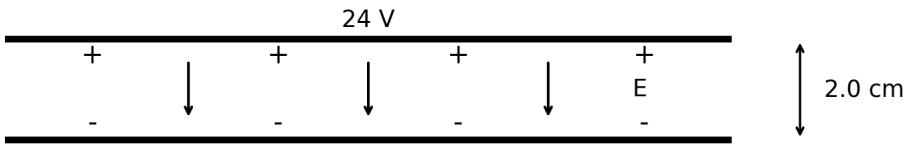
23 **The diagram shows parallel plates. The electric field between the plates is**



- **A** 48 V/m
- **B** 1200 V/m
- **C** 600 V/m
- **D** 2400 V/m

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24 **A voltage of 12 V is applied across a 4.0 Ω resistor. The current through it is**

- **A** 1.0 A
- **B** 2.0 A
- **C** 4.0 A
- **D** 3.0 A

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25 **A copper wire has resistivity 1.7×10^{-8} Ω·m, length 2.0 m and area 1.0×10^{-6} m². Its resistance is**

- **A** 0.017 Ω
- **B** 0.034 Ω
- **C** 0.34 Ω
- **D** 3.4 Ω

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26 **Resistors of 2.0 Ω, 4.0 Ω and 6.0 Ω are connected in series to a 24 V source. The current in the circuit is**

- **A** 2.0 A
- **B** 4.0 A
- **C** 6.0 A
- **D** 12 A

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27 **Resistors of 6.0 Ω and 3.0 Ω are connected in parallel. Their equivalent resistance is**

- **A** 9.0 Ω
- **B** 4.5 Ω
- **C** 2.0 Ω
- **D** 0.50 Ω

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28 An appliance draws a current of 3.0 A from a 12 V source. The power it uses is

- A 4.0 W
- B 12 W
- C 24 W
- D 36 W

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29 A voltage of 12 V is applied across a 6.0 Ω resistor. The power dissipated in the resistor is

- A 12 W
- B 24 W
- C 6.0 W
- D 72 W

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30 **At a junction currents of 5.0 A and 3.0 A flow in and 3.0 A flows out along one branch. The current out along the other branch is**

- A 5.0 A
- B 8.0 A
- C 2.0 A
- D 11 A

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31 **A 100 W lamp is left on for 10 h. The electrical energy it uses is**

- A 0.10 kWh
- B 10 kWh
- C 1.0 kWh
- D 100 kWh

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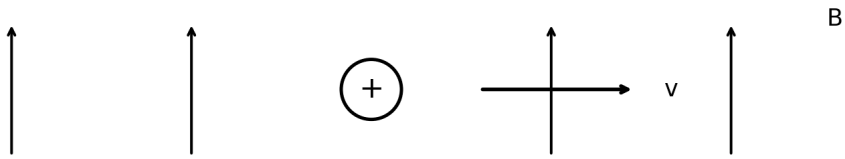
32 **The diagram shows a charged particle moving in a magnetic field. The direction of the magnetic force on the particle is**



- **A** Into the page
- **B** Out of the page
- **C** Upward
- **D** Downward

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33 **A wire of length 0.40 m carries a current of 5.0 A perpendicular to a field of 0.30 T. The force on the wire is**

- **A** 0.060 N
- **B** 0.60 N
- **C** 1.5 N
- **D** 6.0 N

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34 **The magnetic field at a distance of 0.050 m from a long straight wire carrying 10 A is**

- **A** 4.0×10^{-5} T
- **B** 4.0×10^{-6} T
- **C** 2.0×10^{-5} T
- **D** 8.0×10^{-5} T

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35 **A charged particle moves in the magnetic field shown. In which direction does the magnetic force act on the particle**

- **A** Toward the left
- **B** Toward the right
- **C** Upward
- **D** Downward

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36 **A proton moves at 1.0×10^{6} m/s in a circular path in a field of 0.50 T. The radius of its path is closest to**

- A 0.21 cm
- B 21 cm
- C 1.0 cm
- D 2.1 cm

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37 **Near a long straight wire the current is doubled and the distance from the wire is also doubled. The magnetic field strength**

- A is halved
- B is unchanged
- C is doubled
- D is quadrupled

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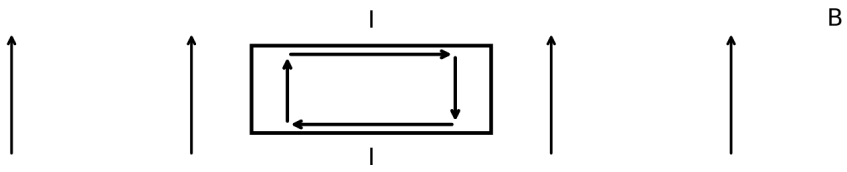
38 **The diagram shows a current loop in a magnetic field. The direction of the magnetic force on the top side of the loop is**



- **A** Out of the page
- **B** Into the page
- **C** Upward
- **D** Downward

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39 **A coil of area 0.020 m² is placed perpendicular to a magnetic field of 0.50 T. The magnetic flux through the coil is**

- **A** 0.0050 Wb
- **B** 0.025 Wb
- **C** 0.010 Wb
- **D** 1.0 Wb

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40 **A coil of 100 turns has its flux per turn change by 0.020 Wb in 0.10 s. The induced emf is**

- A 2.0 V
- B 5.0 V
- C 10 V
- D 20 V

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41 **According to the law of Lenz, the current induced in a coil flows in a direction that**

- A aids the change in flux
- B opposes the change in flux
- C is always clockwise
- D is always counter clockwise

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42 **A rod of length 0.50 m moves at 5.0 m/s perpendicular to a field of 0.40 T. The emf induced between its ends is**

- **A** 1.0 V
- **B** 0.10 V
- **C** 2.0 V
- **D** 10 V

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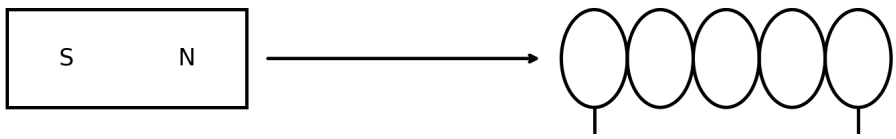
43 **The diagram shows a magnet and a coil. The induced current creates a pole facing the magnet. That pole is**



- **A** N
- **B** S
- **C** No pole
- **D** Both poles

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44 **In a simple generator a coil is rotated in a magnetic field. Rotating the coil faster**

- **A** decreases the maximum emf
- **B** leaves the maximum emf unchanged
- **C** halves the maximum emf
- **D** increases the maximum emf

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45 **A radioactive sample decays through three half lives. The fraction of the original sample remaining is**

- **A** $\frac{1}{3}$
- **B** $\frac{1}{8}$
- **C** $\frac{1}{6}$
- **D** $\frac{3}{8}$

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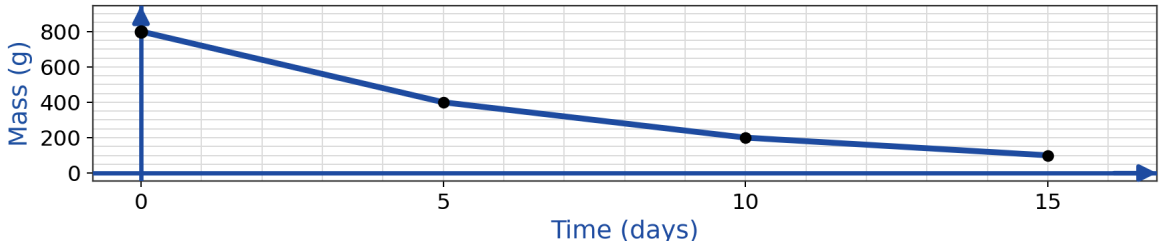
46 **The graph shows the mass of a radioactive sample against time. The half life of the sample is**



- **A** 5 days
- **B** 10 days
- **C** 15 days
- **D** 2.5 days

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47 **A sample has an initial activity of 800 Bq and a half life of 10 days. After 20 days its activity is**

- **A** 400 Bq
- **B** 800 Bq
- **C** 200 Bq
- **D** 100 Bq

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48 **When a nucleus emits an alpha particle, its atomic number Z and mass number A change so that**

- **A** Z increases by 2 and A increases by 4
- **B** Z decreases by 4 and A decreases by 2
- **C** Z is unchanged and A decreases by 4
- **D** Z decreases by 2 and A decreases by 4

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49 **In beta decay a neutron in the nucleus changes into a proton. As a result the atomic number Z**

- **A** decreases by 1
- **B** increases by 1
- **C** is unchanged
- **D** increases by 2

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50 **Of alpha, beta and gamma radiation, the type that is most penetrating in matter is**

A gamma

B alpha

C beta

D all are equal

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ANSWER KEY

1. B
2. C
3. A
4. D
5. B
6. C
7. A
8. D
9. B
10. A
11. C
12. D
13. B
14. A
15. C
16. D
17. B
18. A
19. C
20. D
21. B
22. A
23. B
24. D
25. B
26. A
27. C
28. D
29. B
30. A
31. C
32. B
33. B
34. A
35. A
36. D
37. B
38. A
39. C
40. D
41. B
42. A
43. A
44. D
45. B
46. A
47. C
48. D
49. B
50. A

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