1. An alternating current:

   ☐ has no frequency

   ☐ never changes

   ☐ flows one way only

   ☐ reverses direction periodically

2. A diode conducts current:

   ☐ only at very high voltage

   ☐ never

   ☐ in both directions

   ☐ in one direction only

3. In $V = V_0 \sin(\omega t)$ the coefficient of t is the _____ frequency, equal to $2\pi f$.

   _____

4. Half-wave rectification uses _____ diode.

   _____

5. Mains supply is 50 Hz. What is its period?

   _____ s

6. Where does a smoothing capacitor go?

   ☐ across the a.c. supply, before the diodes

   ☐ in series with the load

   ☐ in series with the diode

   ☐ in parallel with the load

7. On a CRO trace one complete cycle spans 4.0 divisions, with the time-base at 5.0 ms per division. What is the frequency, in Hz?

   _____

8. How many diodes are in a bridge (full-wave) rectifier?

   _____

9. The average power of a.c. in a resistor is _____ the peak power.

   ☐ a quarter of

   ☐ equal to

   ☐ half

10. A full-wave rectified output repeats at twice the frequency of the a.c. input.

    ☐ True ☐ False

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1. **reverses direction periodically**

   a.c. keeps swapping direction – mains does so 50 (or 60) times a second.

2. **in one direction only**

   This one-way behaviour is what lets diodes rectify a.c. into d.c.

3. **angular**

   $\omega = 2\pi f$, so a supply written $\sin(100\pi t)$ has $f = 50$ Hz, not 100π Hz. The angle is in radians, so a calculator left in degrees turns every such step into nonsense.

4. **one**

   A single diode passes the positive half-cycles and blocks the negative ones (leaving gaps).

5. **0.02 s**

   $T = \dfrac{1}{f} = \dfrac{1}{50} = 0.020$ s.

6. **in parallel with the load**

   It must discharge THROUGH the load between peaks, which needs it in parallel. In series it would block the d.c. entirely, which is the opposite of the point.

7. **50.0**

   $T = 4.0 \times 5.0$ ms $= 20$ ms, so $f = \dfrac{1}{0.020} = 50$ Hz. Count divisions for a WHOLE cycle, not a half.

8. **4**

   Four diodes, arranged so the load current always flows the same way whichever input terminal is positive.

9. **half**

   The mean of $\sin^2$ over a cycle is $\frac{1}{2}$, so $\langle P \rangle = \frac{1}{2} P_{\text{peak}}$.

10. **True**

    Both half-cycles become positive humps, so the output ripples at double the input frequency.

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