IMPORTANT: Carefully fill-in your name, student ID number, and section number.

| الاسبا |  | ID \# |  | Sec. |  |
| :--- | :--- | :--- | :--- | :--- | :--- |

Simple calculators are allowed but are not crucial for this test. You may scribble your calculations on the sides and back of this test paper. You may need some of the following information.

| acc. (a) = speed/time | force (F) = m.a | weight ( w ) $=\mathrm{m} . \mathrm{g}$ | work (W) = F.d | $\mathrm{KE}=1 / 2 \mathrm{~m} \cdot \mathrm{v}^{2}$ | $\mathrm{PE}=\mathrm{m} . \mathrm{g} . \mathrm{h}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\text { Power }=\frac{\text { work }}{\text { time }}$ | $\Delta x \propto F$ <br> (Hooke's Law) | density $=\frac{\mathrm{m}}{\mathrm{V}}$ | wt. density $=\frac{\mathrm{mg}}{\mathrm{V}}$ | $\text { pressure }=\frac{\text { force }}{\text { area }}$ | Liquid pressure $=$ wt. density $\times$ depth |
| $\mathrm{E}=\mathrm{m} . \mathrm{g} \cdot \mathrm{h}+1 / 2 \mathrm{~m} \cdot \mathrm{v}^{2}$ | $\mathrm{v}_{\mathrm{f}}=\sqrt{2 \mathrm{~g} . \mathrm{h}}$ | $\begin{gathered} \mathrm{P} \propto 1 / \mathrm{V} \\ \left(\mathrm{P}_{1} \mathrm{~V}_{1}=\mathrm{P}_{2} \mathrm{~V}_{2}\right) \end{gathered}$ | 1 liter $=1000 \mathrm{~cm}^{3}$ | $\begin{gathered} \text { density of water }=1000 \mathrm{~kg} / \mathrm{m}^{3} \\ \text { density of mercury }=13600 \mathrm{~kg} / \mathrm{m}^{3} \end{gathered}$ |  |
| 1 mega (M) = $10^{6}$ | 1 micro $(\mu)=10^{-6}$ | $\mathrm{g}=10 \mathrm{~m} / \mathrm{s}^{2}$ | $1 \mathrm{~m} / \mathrm{s}=3.6 \mathrm{~km} / \mathrm{h}$ | Dimensions: length [L]; mass [M]; time [T] |  |
| 1 giga ( G ) $=10^{9}$ | 1 nano ( n ) $=10^{-9}$ | $1 \mathrm{hp}=0.75 \mathrm{~kW}$ | $1 \mathrm{~Pa}=1 \mathrm{~N} / \mathrm{m}^{2}$ | atmospheric pressure $\approx 100 \mathrm{kPa}$ |  |

1. When we use a ruler of 1 millimeter smallest divisions, the uncertainty is approximately (تقريباً) equal to:

| A | 0.5 mm |
| :--- | :--- |
| B | 2.5 mm |
| C | 5 mm |
| D | $1 \mathrm{~mm} \checkmark$ |

2. The number of reliably (بشكل موثوق) known digits (أرقام) in a number is its:

| A | uncertainty |
| :--- | :--- |
| B | accuracy |
| C | percent error |
| D | significant figures $\checkmark$ |

3. Considering significant figures, the quotient of $\mathrm{A}=$ 12.0 and $B=12$ is written as:

| A | $1.0 \checkmark$ |
| :--- | :--- |
| B | 1 |
| C | 1.00 |
| D | 1.000 |

4. If a person is 70 years old, with average heartbeat rate is 80 beats $/ \mathrm{min}$, his heartbeats in his lifetime can be estimated as (hint: 1 year $=60 \times 24 \times 365 \mathrm{~min}$ ):

| A | $3 \times 10^{9} \checkmark$ |
| :--- | :--- |
| B | $3 \times 10^{7}$ |
| C | $3 \times 10^{8}$ |
| D | $3 \times 10^{6}$ |

5. The maximum capacity in liters of a $3-\mathrm{m}^{3}$ water tank (خزان) is:

| A | 30 L |
| :--- | :--- |
| B | 300 L |
| C | $3000 \mathrm{~L} \checkmark$ |
| D | 3 L |

6. The number $3.69 \times 10^{2}$ is equal to:

| A | $369 \checkmark$ |
| :--- | :--- |
| B | 36.9 |
| C | 3.69 |
| D | 0.369 |

7. The SI unit of mass is the:

| A | newton |
| :--- | :--- |
| B | kilogram $\checkmark$ |
| C | pound |
| D | gram |

8. 1 Mm (mega-meter) equals:

| A | 1000 m |
| :--- | :--- |
| B | $1000 \mathrm{~km} \checkmark$ |
| C | 1000000 km |
| D | 100000 m |

9. The order-of-magnitude of a 9300-m distance is:

| A | $1 \times 10^{4} \mathrm{~m} \checkmark$ |
| :--- | :--- |
| B | $0.1 \times 10^{4} \mathrm{~m}$ |
| C | $2 \times 10^{4} \mathrm{~m}$ |
| D | $10 \times 10^{4} \mathrm{~m}$ |

10. The dimensions of force are:

| A | L M T |
| :--- | :--- |
| B | L M T |


| B | $\mathrm{L} \mathrm{M} \mathrm{T}^{-2} \checkmark$ |
| :--- | :--- |
| C |  |


| C | $\mathrm{L}^{3} \mathrm{M}^{2} / \mathrm{T}^{2}$ |
| :--- | :--- |


| D | $\mathrm{L}^{2} \mathrm{M} \mathrm{T}^{-1}$ |
| :--- | :--- |

11. A cart moves 10 m in the same direction as a $20-\mathrm{N}$ force acting on it. The work done by this force is:

| A | $200 \mathrm{~J} \checkmark$ |
| :--- | :--- |
| B | 2 J |
| C | 0.5 J |
| D | 20 J |

12. The power of a mixer (خلاط) that can do $10,000-\mathrm{J}$ work in 5 s is:

| A | 1000 W |
| :--- | :--- |
| B | 500 W |
| C | 5000 W |
| D | $2000 \mathrm{~W} \checkmark$ |

13. An engine (محرك) can do $75-\mathrm{kJ}$ work in 10 s . The power of this engine in horsepower is:

| A | $10 \mathrm{hp} \checkmark$ |
| :--- | :--- |
| B | 1 hp |
| C | 0.1 hp |
| D | 100 hp |

14. A $20-\mathrm{kg}$ box rests on a $2-\mathrm{m}$ high shelf. Its potential energy relative to the ground is:

| A | 100 J |
| :--- | :--- |
| B | 200 J |
| C | $400 \mathrm{~J} \checkmark$ |
| D | 800 J |

15. The kinetic energy of a $10-\mathrm{kg}$ toy-car moving at a speed of $2 \mathrm{~m} / \mathrm{s}$ is:

| A | 5 J |
| :--- | :--- |
| B | 10 J |
| C | $20 \mathrm{~J} \checkmark$ |
| D | 40 J |

16. The work done by the engine of a $1000-\mathrm{kg}$ car to move it from rest to a speed of $20 \mathrm{~m} / \mathrm{s}$ is:

| A | 50 kJ |
| :--- | :--- |
| B | 100 kJ |
| C | $200 \mathrm{~kJ} \checkmark$ |
| D | 400 kJ |

17. A rock falls from a height of 20 m . Its speed just before touching ground is:

| A | $2 \mathrm{~m} / \mathrm{s}$ |
| :--- | :--- |
| B | $5 \mathrm{~m} / \mathrm{s}$ |
| C | $10 \mathrm{~m} / \mathrm{s}$ |
| D | $20 \mathrm{~m} / \mathrm{s} \checkmark$ |

18. Elements are distinguished (تتمايز) by the number of:

| A | protons $\checkmark$ |
| :--- | :--- |
| B | electrons |
| C | neutrons |
| D | nucleons |

19. The periodic table of elements has __ periods.

| A | $7 \checkmark$ |
| :--- | :--- |
| B | 95 |
| C | 115 |
| D | 18 |

20. Examples of molecules do NOT include:

| A | water |
| :--- | :--- |
| B | carbon $\checkmark$ |
| C | ammonia |
| D | methane |

21. Sand combined with salt is $a(n)$ :

| A | mixture $\checkmark$ |
| :--- | :--- |
| B | element |
| C | compound |
| D | molecule |

22. A $500-\mathrm{g}$ block of wood with dimensions $(10 \mathrm{~cm} \times$ $5 \mathrm{~cm} \times 4 \mathrm{~cm}$ ) has weight density of:

| A | $2.5 \mathrm{kN} / \mathrm{m}^{3}$ |
| :--- | :--- |
| B | $5 \mathrm{kN} / \mathrm{m}^{3}$ |
| C | $10 \mathrm{kN} / \mathrm{m}^{3}$ |
| D | $25 \mathrm{kN} / \mathrm{m}^{3} \checkmark$ |

23. A $20-\mathrm{N}$ retaining force results in a bow when stretched by 5 cm . When stretched by 25 cm , the force is:

24. A cube (مكعب) of iron of $10-\mathrm{cm}$ sides weighs 80 N . The pressure it exerts on a flat surface is:

| A | 80 Pa |
| :--- | :--- |
| B | 800 Pa |
| C | $8000 \mathrm{~Pa} \checkmark$ |
| D | $80,000 \mathrm{~Pa}$ |

25. The pressure that a diver feels 5 m under the surface of a fresh-water (مياه عذبة) lake is (neglect atmos. press):

| A | $50 \mathrm{kPa} \checkmark$ |
| :--- | :--- |
| B | 20 kPa |
| C | 10 kPa |
| D | 5 kPa |

26. Inside a pump (مضخة), air has $\mathrm{P}=2 \mathrm{kPa}$ and $\mathrm{V}=$ 0.5 L . If V increases to $1 \mathrm{~L}, \mathrm{P}$ becomes:

| A | $1 \mathrm{kPa} \checkmark$ |
| :--- | :--- |
| B | 2 kPa |
| C | 4 kPa |
| D | 5 kPa |


| 6 | A |
| :--- | :--- |
| 7 | B |
| 8 | B |
| 9 | A |
| 10 | B |


| 11 | A |
| :---: | :---: |
| 12 | D |
| 13 | A |
| 14 | C |
| 15 | C |


| 16 | C |
| :---: | :---: |
| 17 | D |
| 18 | A |
| 19 | A |
| 20 | $B$ |


| 21 | A |
| :---: | :---: |
| 22 | D |
| 23 | A |
| 24 | C |
| 25 | A |
| 26 | A |

