NAME:

2021 IUT Admission Test Answer Sheet for Contract-Based

1. [5 points] math

Answer:

2. [5 points] math

Answer:

3. [5 points] math

Answer:

4. [5 points] math

Answer:

5. [10 points] math

Answer:

6. [20 points] math

Answer:

7. [20 points] math

Answer:

8. [10 points]

The "area" under the graph is equal to the work (W) done on the block.

$$W = \int_{x_1}^{x_2} F dx$$

$$= \frac{1}{2} \times 3\,\mathrm{m} \times 4\,\mathrm{N} + 2\,\mathrm{m} \times 4\,\mathrm{N} + \frac{1}{2} \times 2\,\mathrm{m} \times 4\,\mathrm{N} = 18\,\mathrm{J}$$

Answer: 18 J

9. [10 points]

The wavelength (λ) and the frequency (f) of light is related as $\lambda f = c$, where c is the speed of electromagnetic waves.

Therefore, the wavelength is obtained to be

$$\lambda = \frac{c}{f} = \frac{(3.0 \times 10^8\,\mathrm{m/s})}{(2.0 \times 10^9\,\mathrm{Hz})} = 0.15\,\mathrm{m} = 15\,\mathrm{cm}$$

Answer: 15 cm

10. [10 points]

The equivalent resistance of the 3-Ω and the 6-Ω resistor is $(3 \times 6)/(3+6) = 2\,\Omega$. Then, the equivalent resistance of three resistors is 2Ω + 4Ω = 6Ω.

The current flowing across the 4-Ω resistor is $\frac{12\,\mathrm{V}}{6\,\Omega} = 2\,\mathrm{A}$. Therefore, the power dissipated in the 4-Ω resistor is $(2\,\mathrm{A})^2 \times 4\,\Omega = 16\,\mathrm{W}$

Answer: 16 W