## Assignment 9

### Due Date: 04-04-21, 09:00 AM

| Task 1 | 1 point |
| Task 2 | 1 point |
| Task 3 | 1 point |
| Task 4 | 1 point |
| Task 5 | 1 point |
| Task 6 | 1 point |
| Task 7 | 1 point |
| Task 8 | 1 point |
| Task 9 | 1 point |
| Task 10 | 1 point |

**Notes:**
- Submit all tasks as a single PDF file.
- Tasks are due on the specified dates.
- Early submissions are not accepted. Your grades are based on your final submission.

### Task 1
1. **Objective:** Determine the total surface area of a rectangular prism.
2. **Instructions:** Calculate the surface area of the following rectangular prisms:
   - **Prism A:** Length = 5 cm, Width = 3 cm, Height = 2 cm
   - **Prism B:** Length = 7 cm, Width = 4 cm, Height = 3 cm
   - **Prism C:** Length = 8 cm, Width = 5 cm, Height = 4 cm

   **Answers:**
   - **Prism A:** 46 cm²
   - **Prism B:** 94 cm²
   - **Prism C:** 140 cm²

### Task 2
1. **Objective:** Compare the surface areas of two cylinders.
2. **Instructions:** Given the radius and height of each cylinder, calculate the surface area using the formula:
   \[ \text{Surface Area} = 2\pi r h + 2\pi r^2 \]
   - **Cylinder A:** Radius = 3 cm, Height = 5 cm
   - **Cylinder B:** Radius = 4 cm, Height = 6 cm

   **Answers:**
   - **Cylinder A:** 90.47 cm²
   - **Cylinder B:** 150.72 cm²

### Task 3
1. **Objective:** Calculate the volume of a sphere.
2. **Instructions:** Given the radius of each sphere, calculate the volume using the formula:
   \[ \text{Volume} = \frac{4}{3} \pi r^3 \]
   - **Sphere A:** Radius = 2 cm
   - **Sphere B:** Radius = 3 cm

   **Answers:**
   - **Sphere A:** 33.51 cm³
   - **Sphere B:** 113.1 cm³

### Task 4
1. **Objective:** Determine the density of a substance.
2. **Instructions:** Given the mass and volume of each substance, calculate the density using the formula:
   \[ \text{Density} = \frac{\text{Mass}}{\text{Volume}} \]
   - **Substance A:** Mass = 2 kg, Volume = 5 m³
   - **Substance B:** Mass = 3 kg, Volume = 6 m³

   **Answers:**
   - **Substance A:** 0.4 kg/m³
   - **Substance B:** 0.5 kg/m³

### Task 5
1. **Objective:** Calculate the force exerted by a fluid on a surface.
2. **Instructions:** Given the pressure and area of each surface, calculate the force using the formula:
   \[ \text{Force} = \text{Pressure} \times \text{Area} \]
   - **Surface A:** Pressure = 5 atm, Area = 2 m²
   - **Surface B:** Pressure = 3 atm, Area = 3 m²

   **Answers:**
   - **Surface A:** 10 N
   - **Surface B:** 9 N

### Task 6
1. **Objective:** Determine the speed of an object.
2. **Instructions:** Given the distance and time of each object, calculate the speed using the formula:
   \[ \text{Speed} = \frac{\text{Distance}}{\text{Time}} \]
   - **Object A:** Distance = 100 m, Time = 20 s
   - **Object B:** Distance = 150 m, Time = 30 s

   **Answers:**
   - **Object A:** 5 m/s
   - **Object B:** 5 m/s

### Task 7
1. **Objective:** Calculate the work done by a force.
2. **Instructions:** Given the force and displacement of each force, calculate the work using the formula:
   \[ \text{Work} = \text{Force} \times \text{Displacement} \]
   - **Force A:** Force = 5 N, Displacement = 10 m
   - **Force B:** Force = 10 N, Displacement = 20 m

   **Answers:**
   - **Force A:** 50 J
   - **Force B:** 200 J

### Task 8
1. **Objective:** Determine the energy required for a process.
2. **Instructions:** Given the energy and efficiency of each process, calculate the energy required using the formula:
   \[ \text{Energy Required} = \frac{\text{Energy}}{\text{Efficiency}} \]
   - **Process A:** Energy = 100 J, Efficiency = 0.5
   - **Process B:** Energy = 200 J, Efficiency = 0.7

   **Answers:**
   - **Process A:** 200 J
   - **Process B:** 285.71 J

### Task 9
1. **Objective:** Calculate the power output of an engine.
2. **Instructions:** Given the efficiency and fuel consumption of each engine, calculate the power output using the formula:
   \[ \text{Power Output} = \text{Efficiency} \times \text{Fuel Consumption} \]
   - **Engine A:** Efficiency = 0.3, Fuel Consumption = 2 L/min
   - **Engine B:** Efficiency = 0.4, Fuel Consumption = 3 L/min

   **Answers:**
   - **Engine A:** 0.6 kW
   - **Engine B:** 0.8 kW

### Task 10
1. **Objective:** Determine the efficiency of a heat engine.
2. **Instructions:** Given the temperature difference and heat transfer of each engine, calculate the efficiency using the formula:
   \[ \text{Efficiency} = \frac{\text{Temperature Difference}}{\text{Heat Transfer}} \]
   - **Engine A:** Temperature Difference = 20 K, Heat Transfer = 100 J
   - **Engine B:** Temperature Difference = 30 K, Heat Transfer = 150 J

   **Answers:**
   - **Engine A:** 0.5
   - **Engine B:** 0.6