Here are 15 multiple-choice questions (MCQs) based on problems related to wave number, wavelength, velocity of light, and frequency:

Multiple Choice Questions:

1. **What is the velocity of light in a vacuum?**
   - a) 3×10^5 m/s
   - b) 3×10^6 m/s
   - c) 3×10^7 m/s
   - d) 3×10^8 m/s
2. **Calculate the wavelength of light with a frequency of 6×10^{14} Hz in a vacuum.**
   - a) 500 nm
   - b) 600 nm
   - c) 700 nm
   - d) 800 nm
3. **What is the wave number for light with a wavelength of 500 nm?**
   - a) 2×10^6 m^{-1}
   - b) 2×10^7 m^{-1}
   - c) 2×10^8 m^{-1}
   - d) 2×10^9 m^{-1}
4. **If the wavelength of light is 400 nm, what is its frequency in a vacuum?**
   - a) 7.5×10^{14} Hz
   - b) 6.5×10^{14} Hz
   - c) 5.5×10^{14} Hz
   - d) 4.5×10^{14} Hz
5. **Find the wavelength of light with a wave number of 4×10^6 m^{-1}.**
   - a) 250 nm
   - b) 500 nm
   - c) 750 nm
   - d) 1000 nm
6. **What is the wave number if the wavelength is 600 nm?**
   - a) 1.67×10^6 m^{-1}
   - b) 1.67×10^7 m^{-1}
   - c) 1.67×10^8 m^{-1}
   - d) 1.67×10^9 m^{-1}
7. **Calculate the frequency of light with a wavelength of 700 nm.**
   - a) 4.29×10^{14} Hz
   - b) 5.29×10^{14} Hz
   - c) 6.29×10^{14} Hz
   - d) 7.29×10^{14} Hz
8. **What is the wavelength of light that has a frequency of 5×10^{14} Hz?**
   - a) 500 nm
   - b) 600 nm

   - c) 700 nm
   - d) 800 nm
9. **Find the wave number for light with a frequency of 6×10^{14} Hz.**
   - a) 2×10^6 m^{-1}
   - b) 3×10^6 m^{-1}
   - c) 4×10^6 m^{-1}
   - d) 5×10^6 m^{-1}
10. **Calculate the frequency of light with a wavelength of 450 nm.**
   - a) 6.67×10^{14} Hz
   - b) 5.67×10^{14} Hz
   - c) 4.67×10^{14} Hz
   - d) 3.67×10^{14} Hz
11. **What is the velocity of light with a wavelength of 300 nm and a frequency of 1×10^{15} Hz?**
   - a) 2×10^8 m/s
   - b) 3×10^8 m/s
   - c) 4×10^8 m/s
   - d) 5×10^8 m/s
12. **Calculate the wavelength if the wave number is 3×10^7 m^{-1}.**
   - a) 100 nm
   - b) 200 nm
   - c) 300 nm
   - d) 400 nm
13. **Find the wave number of light with a wavelength of 250 nm.**
   - a) 4×10^6 m^{-1}
   - b) 4×10^7 m^{-1}
   - c) 4×10^8 m^{-1}
   - d) 4×10^9 m^{-1}
14. **What is the frequency of light with a wave number of 5×10^6 m^{-1}?**
   - a) 1.5×10^{14} Hz
   - b) 2.5×10^{14} Hz
   - c) 3.5×10^{14} Hz
   - d) 4.5×10^{14} Hz
15. **Calculate the wave number if the wavelength is 1000 nm.**
   - a) 1×10^6 m^{-1}
   - b) 1×10^7 m^{-1}
   - c) 1×10^8 m^{-1}
   - d) 1×10^9 m^{-1}

Answer Key:

1. d) 3×10^8 m/s
2. b) 500 nm
3. c) 2×10^8 m^{-1}
4. a) 7.5×10^{14} Hz
5. d) 1000 nm
6. b) 1.67×10^7 m^{-1}
7. a) 4.29×10^{14}
8. b) 600 nm
9. b) 3×10^6 m^{-1}

10. a) 6.67×10^{14} Hz
11. b) 3×10^{8} m/s
12. c) 300 nm
13. b) 4×10^{7} m^{-1}
14. d) 4.5×10^{14} Hz
15. a) 1×10^{6} m^{-1}