

STEP Physics Final Exam Review: June 2021

The Final Exam will consist of two parts:

Part I: 30 Multiple Choice Questions fairly evenly distributed among the chapters. (40 points)

Part II: 6 problems which must be worked out properly. (60 points)

1. Relativity (Chapter 27)
2. Refraction (Chapter 17)
3. Concave Mirror (Chapter 16)
4. Convex Lens (Chapter 17)
5. Coulomb's Law (Chapter 19)
6. Electric Circuit (Chapter 21)

Chapters:

13 Oscillations and waves - Frequency, Amplitude, Wavelength, Period, Longitudinal waves, Transverse waves, Superposition and Interference, Constructive Interference, Destructive Interference

14 Sound – Beats, Doppler Effect

15 Light – Speed, Electromagnetic Spectrum

16 Reflection and mirrors – Angle of incidence, Angle of Reflection, Law of Reflection, Reflection from Plane Mirror, Reflection (Ray Tracing) for a Concave Mirror, Real and Virtual images

17 Refraction and lenses – Speed of light in various substances, Index of Refraction, Snell's Law, Bending toward/away from the normal, Types of Lenses, Ray Tracing for a Convex Lens,

18 (Omit)

19 Electric Charges and Forces – Types of charge, Coulomb's Law, Conductors, Insulators

20 Electric Fields and Electric Energy – Magnitude of Electric Field, Rules for drawing Electric Field lines, Change in Electric Potential ($V = w/q$)

21 Electric Current and Electric Circuits - Electric Current, Resistance, Ohm's Law, Resistor, Diode, Series Circuit (and relationships), Parallel Circuit (and relationships), $Power=VI$, $Energy = Pt=VI t$

27 Special Relativity – 2 postulates AND Time dilation.

Some Videos which may help with part II:

Wave Speed: <http://www.youtube.com/watch?v=jAXx0018QCc>

Refraction: <http://www.youtube.com/watch?v=Gek2ttedf0Y>

Concave Mirror: <http://www.physicsclassroom.com/mmedia/optics/rdcmc.cfm>

Another concave mirror: <http://www.youtube.com/watch?v=7iK1nIJs49Y>

Convex Lens: <http://www.youtube.com/watch?v=c6mLLaqLdvg>

Coulomb's Law: <http://www.youtube.com/watch?v=NERe7NLV6a8>

Series Circuit Calculations: <http://www.youtube.com/watch?v=zgONtlnph3c>