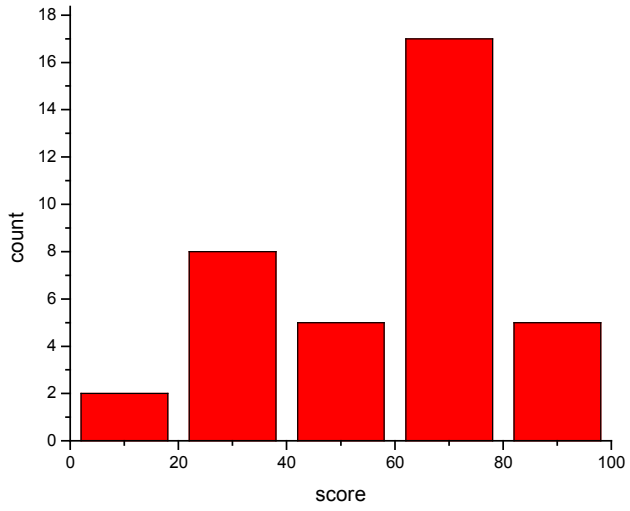

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Summer 2010. Exam 1. QQ 1-3

1) Two small charged objects attract each other with a force F when separated by a distance d. If the charge on each object is reduced to one-fourth of its original value and the distance between them is reduced to d/2 the force becomes:

1. F/16
2. F/8
3. **F/4**
4. F/2
5. F

2) Charge Q is distributed uniformly throughout a spherical insulating shell. The net electric flux in N · m2 /C through the inner surface of the shell is:

1. **0**
2. Q/ε_o
3. $2Q/\varepsilon_o$
4. $Q/2\ \varepsilon_o$
5. $Q/2\pi\ \varepsilon_o$

3) Total negative charge on the electrons in 1 kg of helium (atomic number 2, molar mass 4) is:

1. 48C
2. 2.4×10^7 C
3. **4.8×10^7 C**
4. 9.6×10^8 C
5. 1.9×10^8 C

Summer 2010. Exam 1. QQ 4-6

4) A conducting sphere of radius 1 cm has a charge of 1.0×10^{-9} C deposited on it. The magnitude of the electric field in N/C just outside the surface of the sphere is:

1. 0
2. 450
3. 900
4. 4500
5. **90, 000**

5) Charge is distributed uniformly along a straight wire. The electric field 2 cm from the wire is 20 N/C. The electric field 4 cm from the wire is:

1. 120 N/C
2. 80 N/C
3. 40 N/C
4. **10 N/C**
5. 5 N/C

6) A 3.5-cm radius hemisphere contains a total charge of 6.6×10^{-7} C. The flux through the rounded portion of the surface is 9.8×10^4 N · m^2 /C. The flux through the flat base is:

1. 0
2. $+2.3 \times 10^4$ N · m^2 /C
3. **-2.3×10^4 N · m^2 /C**
4. -9.8×10^4 N · m^2 /C
5. $+9.8 \times 10^4$ N · m^2 /C