No.M1   Ohm's law in the simplest case is written as
   a) $B = \mu \cdot \mu_0 H$
   b) b) $D = \varepsilon\varepsilon_0 E$
   c) $J + j \times \Omega = \sigma\, (E + v \times B)$
   d) $\nabla \times E = -\partial B / \partial$

No.M2   In the system of Maxwell's equations, the differential equation $\overrightarrow{\nabla \cdot D} = = \rho$ is the expression of
a) total current law
b) conditions of closed magnetic lines
c) conditions for the production of space charge
d) Faraday's law

No.M3   A copper calorimeter weighing $m_1 = 1$kg contains water at 7^0C Celsius. The mass of water is $m_2 = 3$kg. A piece of aluminum weighing $m_3 = 0.5$ kg was immersed in the calorimeter. It has the temperature of 77^0C Celsius. Calculate the change in entropy of the system when equilibrium temperature is established.
a) +13,21 J C^{-1}
b) +25,70 J C^{-1}
c) -5,58 J C^{-1}
d) -17,78 J C^{-1}

No.M4   Does the principal focal length of a lens depend on the medium in which it is immersed? Can this lens be used in one environment as a converging lens, and in another environment as a diverging one?
a) yes, yes
b) no, no
c) yes, no
d) no, yes

No.M5   Two parallel wires, one end of which is insulated and the other is inductively connected to a electromagnetic oscillator, are immersed in alcohol. Standing waves arise in the system with appropriate selection of the oscillation frequency. The distance between the two adjacent nodes of standing waves on the wires is 40 cm. Taking the dielectric constant of alcohol $\varepsilon = 26,$ and its magnetic permeability $\mu = 1$, calculate the oscillation frequency of the generator.
a) 53.1MHz
*b) 1*7.5MHz
c) 73.5MHz
d) 44.8MHz

No.M6   An electromagnetic wave propagates along the x axis. Determine the dielectric constant of medium ε if the average energy density <W> in the electromagnetic wave is equal to 2.43 PJ/m³, and the amplitude of the electric field strength E_0 of the wave is equal to 0.5 V/m.

a) 2.2
b) 1.4
c) 3.2
d) 1.8
e) 4.5

No.M7 How many times will the light pressure created by the radiation of a star increase when the temperature of its surface doubles?
a) 16
b) 2
c) 4
d) 8
e) it won't change

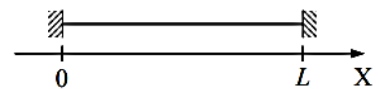**No.M8** Can the optical path length between two points ever be less than the geometric path length between them? If so, prove it.

Answer_____

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No.M9 Between the poles of the electromagnet there is a coil, whose axis coincides with the direction of the magnetic field. The coil has $N = 15$ turns with an area $S = 2.0$ cm². When the coil is rotated through angle $\varphi = 180°$ around its diameter, a charge of **q** $= 4.5$ μC flows through the galvanometer connected to it. Find the magnetic field induction module $\vec{B}$ between the poles if the resistance of the electric circuit is $R = 40$ ohm.
a) 10 mT
b) 30 mT
c) 25 mT
d) 20 mT
e) 35 mT

No.M10 A steel string of length $L = 110$ cm, density $\rho = 7.8$ g/cm³ and diameter $d = 1$ mm is stretched between the poles of an electromagnet. When an alternating current with the frequency of $v = 256$ Hz is passed through the string, an elastic transverse wave is excited in it, and $n = 5$ half-waves are stacked along the length of the string. Calculate the tension force of the string.
a) 59.5N
b) 35.7N
c) 77.7N
d) 27.5N
e) 66.5N