KING FAHD UNIVERSITY OF PETROLEUM & MINERALS
DEPARTMENT OF PHYSICS

PHYS 133 – FINAL EXAMINATION
(TERM 062)
Instructor: Dr. Al-Solami

Name: _____ ID # _____

CHOOSE 15 PROBLEMS ONLY

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Problem #	Grade/10
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Total / 150	**Total / 30**

1. At what temperature will cooper have the same resistivity as tungsten does at 20° C?

((ρ copper at 20° C)=1.68×10^{-8} Ω.m) (ρ tungsten at 20° C)=5.6×10^{-8} Ω.m))

2. Find the resistance of a 10m copper wire 1.5mm in diameter.

$(\rho$ copper at 20° C$)=1.68\times10^{-8}\,\Omega.m)$

3. What is the resistance and current through a 100-W light if connected to a 120 V source?

4. Determine the magnitudes and direction of the currents through each resistor in the figure below:

5. Find the net resistance and current of the flowing circuit. Take each resistance to be 30Ω.

6. Two capacitors C1=10μF and C2=30μF connected in parallel to a 12V battery. Find the charge in each capacitor.

7. A 2cm high object is placed 20 cm from a concave mirror whose radius of curvature is 15cm. Find

    a) The image position
    b) The image size

8. Sunlight is observed to focus at a point 15cm behind a lenses:
    a) What kind of lenses is this?
    b) What is its radius?

9. Find the rate of heat transferred by conduction through a concrete wall, 3.0 m high, 4.0 m long and 0.2 m thick, if one side of the wall is held at 20°C and the other side is at 40°C.

(Thermal conductivity of concrete is 0.8 J/S.m.c^{o})

10. What will be the equilibrium temperature when 300g copper mass at $300^{\circ}C$ is placed in 1000g of water at $10^{\circ}C$?

$$(C_w = 1 \text{ cal/g.c}^{\circ}, \quad C_{cu} = 0.093 \text{ cal/g.c}^{\circ})$$

11. Find the rms speed of H_2 molecule when the temperature is $20^{\circ}C$.
(Atomic weight of H_2 is 2 g/mole).

12. A copper steam pipe is 2 m long when the temperature is 20^oC. What is the length of the pipe when it carries steam at 120^oC?
      (coefficient or thermal expansion for copper is $17 \times 10^{-6}/C^o$)

13. A 1500kg car has a net forward force of 4500 N applied to it. Find the change in its kinetic energy after it has traveled 100m.

14. A traffic light weighing 100 N hangs as shown. Find T1 and T2.

15. A train moving at a speed of 40 m/s sounds its whistle, which has a frequency of 500 H_z. Determine the frequency heard by a stationary observer as the train approaches.

16. A car increases its velocity from 80 km/h to 120 km/h in a distance of 100m. Find the magnitude of its acceleration.

17. An FM radio station broadcasts of a frequency of 100 MHz (M=mega=10^6) with a radio wave having wavelength of 3.0 m. Find the speed of the radio wave.