**THE PRESIDENT’S OFFICE**

**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**

**FORM THREE ANNUAL EXAMS, NOVEMBER 2021**

**PHYSICS**

**INSTRUCTIONS: Time: 3:00Hours**

1. This paper consists of section A, B and C with total of eleven (11) questions
2. Answer ALL question from section A and B, and ONLY two questions from section C
3. Where necessary use the following constant

* Acceleration due to gravity g = 10m/s2
* Specific heat capacity of water = 4200J/KgoC
* Specific heat capacity of Aluminum = 900J/KgoC
* Pie = 3.14

**SECTION A (15 MARKS)**

Answer all questions in this section

1. For each of the following items (i – x) choose the most correct answer among the given alternatives and write its letter in the answer sheet provided
2. \_\_\_\_\_\_\_\_\_\_\_ is the area around a magnet current carrying conductor where magnetic strength can be detected by compass
3. Magnetic domain
4. Induced field
5. Magnetic field
6. Neutral point
7. Magnetic poles
8. Which of the following statement is correct?
9. For a given body a friction force depends on the nature of area in conductor with the surface
10. Walking would be made easy if the friction did not exist
11. Friction acts in the same direction as motion
12. Certain lubricants can reduce friction to zero
13. Air friction can cause body to become hot
14. The absolute zero temperature is equivalent to
15. -273 B. O0C C. -2230C D. 273K E. 2730C
16. Which of the following apparatus is used for measuring the volume of irregular solid?
17. Pipette
18. Beaker
19. Measuring cylinder
20. Metre rule
21. Burette
22. A device that opens or closes a circuit in responses to change in temperature is
23. Thermometer
24. Thermostat
25. Switch
26. Key
27. Thermopile
28. A suspended magnetic needle always comes to rest with axis in a vertical plane called
29. Geographic meridian
30. Magnetic meridian
31. Geographic declination
32. Magnetic declination
33. Geographic North pole
34. Convert -400C to 0F
35. 104 B. 40 C. 41 D. 32 E. -40
36. An automechanic wants to measure the length of an object in accuracy of 0.01cm, which of the following instruments can be used
37. Metre rule
38. Micrometer screw gauge
39. Vernier callipers
40. Tape measure
41. Calorimeter
42. A machine is a device which normally
43. Increase power
44. Magnifies forces
45. Save time
46. Create forces
47. Decrease power
48. In the secondary rainbow the violet colour is
49. Inside the bow
50. Between red and yellow
51. At the middle of the bow
52. Outside the bow
53. Match the responses in list B with phrases in List A by writing the letter of a correct response beside item number or space provided

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| **LIST A** | **LIST B** |
| 1. Relative humidity 2. Hydrogen bonding of water 3. Slippery of ice 4. Dew point 5. Regelation | 1. Temperature at which the water vapour present in the atmosphere/air is just sufficient to saturate it 2. Formation of the thin film of water between the surface of the body and the ice 3. Peculiar property of water 4. Increases the density of water 5. The ratio of the mass of water vapour in a given volume of air to the mass of water vapour required to saturate the same volume of air at the air temperature is removed 6. The process by which an ice melts when the pressure is applied on it and refreeze when the pressure is removed 7. The process by which a solid substance is converted into liquid form |

**SECTION B (60 MARKS)**

Answer all questions in this section

1. a) Distinguish between scalar and vector quantity

b) A body is acted on by three forces F1, F2 and F3. F1 is a force of 3N and acts

in the northward direction, and F2 is a force of 4N and acts in the eastward

direction. Find the magnitude and direction of F3 if the body is in equilibrium

c) Define power and workdone

d) A body scout whose mass is 50kg climbs with constant speed a vertical rope of

5m in 10 seconds.

(i) How much work does he perform?

(ii) What is his power output during the climb?

1. a) Define the following terms as applied in physics
2. Focal length (ii) Principal focus (iii) centre of curvature

(iv) radius of curvature (v) a pole of curved mirror

b) Distinguish between real and virtual image

c) A converging lens of focal length 15cm produces a real image four times larger than object. How far from lens is the object?

1. a) Why does metal seems colder to touch than the wood on a cold morning out

door?

b) It is found that 9.2 x 102J of heat is needed to heat 2kg of iron from 250C to

350C. What is the specific heat capacity of iron?

c) When cooking rice, Tanzanian house wives normally finish off by placing a

cover on which there is burning charcoal over the pot containing rice. Explain

why this method dries the rice better than when not used?

1. a) List (3) factors that determine the resistance of a conductor

b) State Ohm’s law

c) Two resistors of 2Ω and 5Ω are connected in parallel, then connected in series

to a 3Ω resistor. If a cell of 4v is connected across the resistors, calculate

(i) Total resistance

(ii) Current through 5Ω resistor

1. Current through 2Ω resistor
2. State the laws of refraction of light

(b) The refractive index of water is 1.33. A tank 5m deep is full of water. How

much does the bottom appear to be?

c) With the aid of clear labeled diagrams Illustrate the following

(i) Regular reflection of light

(ii) Irregular reflection of light

1. (a) (i) Define centre of gravity
2. Explain why racing cars should have wide wheel tracks

(b) State conditions for stable, unstable and neutral equilibrium and give one

example of each condition

(c) ( i) Why should a mechanic choose a long spanner to undo a tight nut?

(ii) A uniform half meter rule is pivoted at its 30cm mark. A mass of 50kg hung

at the 45cm mark keeps the rule horizontal. Determine the mass of the half

meter rule.

**SECTION C (25 MARKS)**

Answer only **two (2)** questions in this section

1. (a) State (i) Archimedes principle

(ii) The law of flotation

(b) A piece of wood floats in pure water with ¾ of its volume submerged. If the

same piece of wood is thrown into an ocean whose salty water has relative

density of 1.025, what fraction of its volume would be submerged in the salty

water?

( c) Explain why, when opening the door, it is preferable to push it at its edge.

(d) Define moment of a force

1. (a) State the law of conservation of energy

(b) A pendulum bob of mass 50g is pulled aside to a vertical height of 20cm

from the horizontal and then released. Find

(i) The maximum potential energy of the bob.

(ii) The maximum speed of the bob

(iii) The K.E of the bob when it is at a height of 8cm from the horizontal

(c) Name one device which change

(i) Sound energy into electric energy

(ii) Electrical energy into heat energy

11. (a) Distinguish between speed and velocity

(b) Draw a velocity – time graph for a body thrown vertically upwards to the

maximum height h(m) before it hit the ground after time t (sec)

(c) A car moving with a velocity of 100m/s is decelerated at 2.5m/s2 to a stop.

Calculate

(i) The distance travelled by the car before it is brought to rest

(ii) The time taken for the car to stop

d) A domestic electric bulb is marked 240V, 100W. Calculate

(i) The maximum current it can take

(ii) The resistance of the filament of the bulb

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