Candidate's name:

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535/1
PHYSICS
Paper 1
JULY 2022
$2\frac{1}{4}$ hours

(MEPSA) RESOURCEFUL ASSESSMENT 2022

Uganda certificate of education

MOCK EXAMINATIONS

PHYSICS

Paper 1

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Section A contains 40 objective type questions. You are required to write the correct answer A, B, C or D against each question in the box on the right hand side.

Section B contains 10 structured questions. Answers are to be written in the spaces provided on the question paper.

Mathematical tables and silent non-programmable calculators may be used.

Acceleration due to gravity, $g = 10\,ms^{-2}$

Specific heat capacity of water $= 4200\ Jkg^{-1}K^{-1}$

For Examiners' Use only

Q. 41	Q.42	Q.43	Q.44	Q.45	Q.46	Q.47	Q.48	Q.49	Q.50	MCQ	**Total**

Turn Over

SECTION A : (40 MARKS)
SECTION A

Answer **all** *questions from this section*

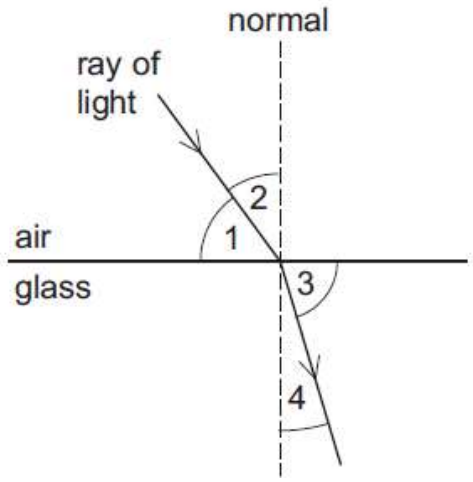
1. The quantity whose unit is a joule is
   A. Current
   B. Work
   C. Force
   D. Voltage

2. Mercury is not used to measure very low temperatures because it
   A. expands regularly
   B. has a high boiling point?
   C. does not wet glass
   D. has a high freezing point

3. A water fall can be used to produce electricity because it has
   A. electrical energy
   B. light energy
   C. mechanical energy
   D. sound energy

4. The diameter of a wire is best measured by
   A. a meter rule
   B. Venire calipers
   C. a tape measure
   D. a micrometer screw gauge

5. The diagram shows a ray of light entering a block of glass.



Which numbered angles are the angles of incidence and of refraction?

	Angle of incidence	Angle of refraction
A	1	3
B	1	4
C	2	3
D	2	4

6. The rate of diffusion of molecules increases with increase in
   A. molecular weight of molecules
   B. size of the diffusing molecules
   C. density of the substance
   D. temperature

7. A person pushes a toy cart along a level road and lets it to go. Which one of the following presents the correct order of energy changes which occur when the cart slows down to rest?

A. Heat energy $\longrightarrow$ Kinetic energy + Sound energy
B. Kinetic energy $\longrightarrow$ Heat energy + Sound energy
C. Kinetic energy $\longrightarrow$ Potential energy + Sound energy
D. Potential energy $\longrightarrow$ Heat energy + Sound energy

8. Which one of the following effects will take place when two equal and opposite forces act on a moving object? It

A. accelerates uniformly
B. is brought to rest
C. changes direction
D. moves with the same speed

9. An object is placed between a convex lens and its principal focus. Which one of the following statements about the image formed is true?

A. real, magnified and erect
B. virtual, magnified and erect
C. virtual, diminished and inverted
D. real, diminished and inverted.

10. Air conditioners are placed near the ceilings other than the floor because they

A. create path for radiation to be emitted to every corner of the room
B. make conduction of heat more efficient for the whole room
C. keep the whole room warm because hot air rises and cold air sinks
D. keep the whole room cool because hot air rises and cold air sinks

11. The following readings were obtained in an experiment to determine the density of a liquid

Mass of an empty beaker = 20g
Mass of beaker + liquid = 70g
Volume of the liquid used = 60 cm^3

Using the above data, find the density of the liquid in g cm^{-3}

A. $\left(\frac{70+20}{60}\right)$
B. $\left(\frac{70-20}{60}\right)$
C. $\left(\frac{60}{70-20}\right)$
D. $\left(\frac{70}{60-20}\right)$

12. Which one of the following determines whether a body will float in a liquid?

A. Weight of the body
B. Volume of the body
C. Surface area of the body
D. Average density of the body

13. Find the power expended when a pump lifts 200kg of water through a vertical height of 0.6m in 1s

A. 33.3 W
B. 120.0 W
C. 333.3 W
D. 1200.0W

14. Which one of the following atoms are isotopes?

A. $^{16}_{8}X$ and $^{16}_{8}Y$
B. $^{30}_{16}X$ and $^{32}_{16}Y$
C. $^{19}_{9}X$ and $^{40}_{19}Y$
D. $^{28}_{14}X$ and $^{30}_{16}Y$

15. Objects viewed through a blue-tinted glass appear blue the

A. glass is transparent
B. glass transmits only blue
C. glass reflects only blue
D. objects reflect the blue color

16. A body weighs 520 N on earth. If the acceleration due to gravity is 9.8 ms^{-2}, find the mass of the body in grammes.

A. $\left(\frac{520\times1000}{9.8}\right)$
B. $\left(\frac{9.8\times1000}{520}\right)$
C. $\left(\frac{520\times9.8}{1000}\right)$
D. $(520\times9.8\times1000)$

17. Which one is the correct order of decreasing wavelength of radiations?

A. Gamma rays, X-rays, ultra-violet, visible light, infra-red and radio waves
B. Radio waves, infra-red, visible light, ultra-violet, X-rays and gamma rays
C. X-rays, gamma rays, visible light, ultra-violet, infra-red and radio waves.
D. Gamma rays, X-rays, infra-red, visible light, ultraviolet and radio waves

18. Figure 2 shows a semi-circular glass block in which light incident at angle of 48° with the glass-air interface is refracted along the interface.

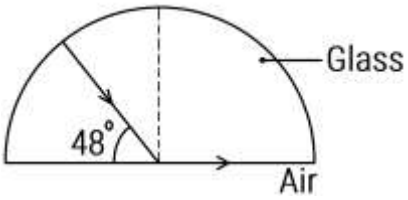


Fig. 2

Find the refractive index of the glass

A. $\frac{\sin42^0}{\sin90^0}$
B. $\frac{\sin90^0}{\sin42^0}$
C. $\frac{\sin48^0}{\sin90^0}$
D. $\frac{\sin90^0}{\sin48^0}$

19. A person carrying a heavy load on bare head puts on a head ring made of banana leaves so that the

A. area of contact with the load is big and pain is lower
B. area of contact with the load is small and pain is lower
C. force exerted by the load is lower and the pain is lower
D. force exerted by the load is higher and the pain is lower

20. A gun of mass 10kg fires a bullet of mass 0.05kg with a velocity of 400ms^{-1}. Find the recoil velocity of the gun.

A. $\left(\frac{0.05\times400}{10}\right)ms^{-1}$
B. $\left(\frac{10\times400}{0.05}\right)ms^{-1}$
C. $\left(\frac{0.05\times10}{400}\right)ms^{-1}$
D. $(0.05\times10\times400)\,ms^{-1}$

21. The distance between two successive points on a wave is 4cm. If the frequency of the wave is 50Hz, find its velocity in ms^{-1}.

A. $\left(\frac{4\times100}{50}\right)$

B. $\left(\frac{50}{50\times100}\right)$

C. $\left(\frac{4\times50}{100}\right)$

D. $\left(\frac{100}{4\times50}\right)$

22. Figure 3 shows a bar magnet which has picked up an iron nail

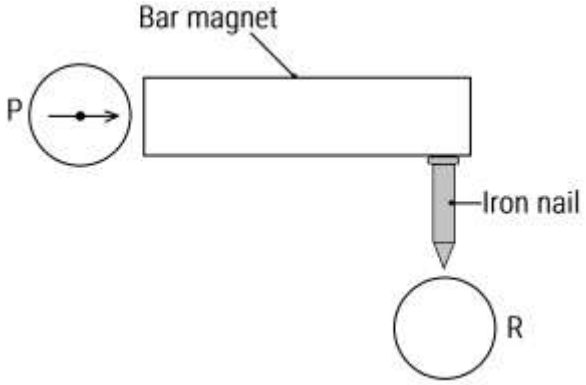


Fig. 3

If the plotting compasses P and R are placed in the positions shown, in which direction will R point?

A. 

B. 

C. 

D. 

23. When constructing large halls, some reverberation is left to occur because

A. it enables production of a loud sound

B. the audience absorbs some sound and without reverberation left, sound is not heard clearly

C. the speakers in the hall need to hear the echo so as to hear what they are saying

D. all the sound will move outside the hall and the people inside will not hear

24. A spanner length 20 cm is used to tighten a nut. If a force of 50N is applied at right angles to the end of the spanner, find the moment of the applied force

A. (20×50)Nm

$\left(\frac{20\times50}{100}\right)$Nm

B. $\left(\frac{100\times50}{20}\right)$Nm

C. $\left(\frac{100\times20}{50}\right)$Nm

25. What happens to speed, frequency and wavelength of a wave as it travels from shallow end to the deep end of a ripple tank?

	Speed	**Frequency**	**Wavelength**
A.	Increases	Remains the same	Remains the same
B.	Decreases	Remains the same	Decreases
C.	Increases	Remains the same	Increases
D.	Decreases	Increases	Increases

26. In an oil film experiment, the thickness of the oil film is taken to be the size of the oil molecule because the

A. oil film is cylindrical
B. oil drop spreads until it is one molecule thick
C. lycopodium powder makes the oil film visible
D. volume of the oil is equal to the volume of the oil film

27. Reflecting prisms are preferred to plane mirror in optical instruments because

(i) no energy is lost to refraction and reflection
(ii) Clear images are formed
(iii) they are easier to fix

A. (i) and (ii) only B. (ii) and (iii) only
C. (i) and (iii) only D. (i), (ii) and (iii)

28. A car starts from rest and accelerates uniformly at $2ms^{-2}$. Find the distance it covers in 6s.

A. 12m B. 36m C. 72m D. 108m

29. Which of the following statements is <u>false</u> with respect to convex mirrors?

A. Images are virtual for all real object positions
B. images are diminished for all object positions
C. the image is always between the pole and focal point
D they are used as rear-view mirrors in vehicles

30. Two forces of 6N and 8N act on an object P as shown in the figure3 below. The resultant force on the object is

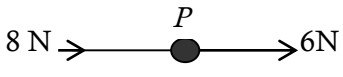


Fig. 3

A. 1.33 N B. 2 N C. 10 N D. 14N

31. A body starting from rest is uniformly accelerated to a velocity of 40 m/s in 5 seconds. Calculate the distance traveled in this time interval.

A. 8m B. 100 m C. 200 m D. 320 m

32. Which one of the following is not a factor on which the frequency of waves produced in strings depend?

A. length of the string B. Nature of material from which the string is made
C. Tension in the string D. wavelength of the wave

33. The graph in figure5 below shows the variation of efficiency of a block and tackle pulley system with load.

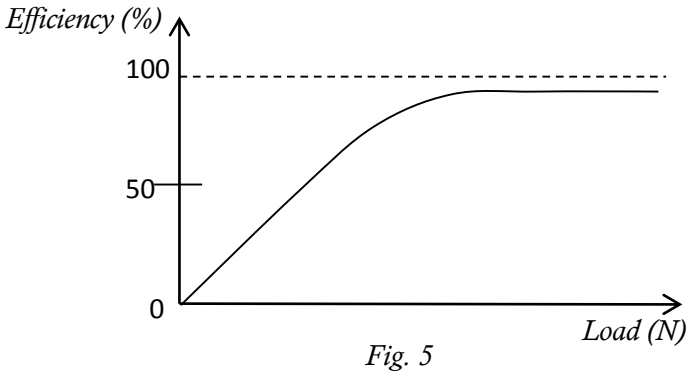


Fig. 5

The graph tends towards 100% efficiency as the load increases since
A. Mechanical advantage is directly proportional to the applied force
B. Mechanical advantage is never equal to velocity ratio
C. Energy is wasted in overcoming friction
D. the weight of the string and moving pulley becomes negligibly small as the load increases

34. A certain F.M radio station operates at a frequency 108 x 10^6 Hz. Calculate wavelength of the radio waves.

A. 2.96 x 10^{-6} m B. 2.78 m C. 0.36m D. 3.375×10^5m

35. An object is placed *15 cm* in front of a convex lens of focal length *10cm*. The position of the image from the lens is

A. 6 cm B. 30 cm C. 25 cm D. 20 cm

36. When a capillary tube is dipped into mercury;

A. cohesion between the mercury molecules is greater than the adhesion of the molecules for glass so the liquid rises in the tube
B. cohesion between the mercury molecules is greater than the adhesion of the molecules for glass so there is capillary depression
C. adhesion forces between the liquid and glass is greater hence capillary rise
D. Adhesion forces between the liquid and glass is greater hence capillary depression.

37. Choose the odd statement with respect to action of the lightning conductor.

A. A charged cloud near a lightning conductor induces charges in the conductor
B. the similar charge to the one on the cloud is repelled to the ground
C. the sharp end of the lightning conductor serves to pierce the cloud
D. point action occurs at the sharp point owing to the high charge density at the point

38. Which of the following statements are conditions for a body to stay in mechanical equilibrium?

(i) The sum of forces in one direction is equal to the sum of forces in the opposite direction.
(ii) The clockwise forces are equal to anticlockwise forces.
(iii) The sum of moments about a chosen point is zero.
(iv) The body rotates in one direction.

A. (i) and (iv) only B. (ii) and (iii) only
C. (i), (ii)and(iii)only D. (i) and(iii) only

39. The quantity of matter per cubic metre is;

A. mass B. volume C. density D. pressure

40. Atabo stands a distance from the cliff and claps. She hears an echo after 0.02minutes, if speed of sound in air is $340ms^{-1,}$ the distance between the cliff and Atabo is;
A. 408m B. 204m C. 340m D. 816m

SECTION B

41. (a)What is ferromagnetic material? (01mk)

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(b) Describe briefly how to magnetize a steel bar using an electrical method. (02marks)

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(c) Give two examples of non-magnetic materials. (01mark)

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42. (a)(i) What is meant by capillary depression? (01mark)

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(ii) Give one example of a liquid which undergoes capillary depression. (01mark)

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(b) Briefly explain the causes of capillary depression. (02marks)

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43. (a) State one application in which knowledge of density is required. (01mark)

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(b) Explain why it is not easy to determine the density of a substance in a powder form. (01mark)

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(c) A piece of rubber of density 1.45 gcm^{-3} displaces 25 cm^3 of water when placed in a cylinder of water. Calculate the mass of the rubber. (02marks)

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44. (a) Define Mechanical Advantage of machine. (01mark)

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(b) Figure 6 shows a load of 10N being raised by a simple frictionless pulley system

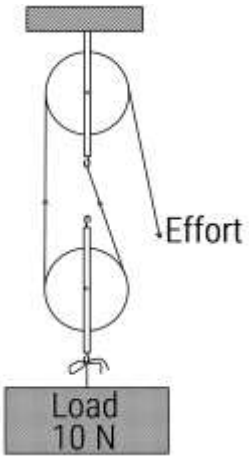

Fig. 6

(i) What is the velocity ratio of the system? (01mark)

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(ii) Calculate the effort required to lift the load if the mass of the pulley is 0.2kg. (02marks)

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45. (a) What is an antinode as applied to a stationary wave? (01mark)

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(b) The distance between two successive antinodes of a standing wave on a string vibrating at 80Hz is 24cm. Find the speed of the waves. (02marks)

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(c) Why is sound clearer at night than during day? (01mark)

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46. (a)(i) What is energy? (01mark)

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(ii) State in order of occurrence the energy changes that take place when a torch bulb is switched on. (01mark)

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(b) Calculate the work done to move a load of 50N through a distance of 60.0cm. (02marks)

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47. (a)What are **secondary colours**? (1mark)

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(b) What will be the appearance of a yellow dress in a room with a blue bulb? (1mark)

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(b) A lens forms an image at 60cm in front of the lens of an object 5cm tall. If the height of the image is 20mm, find the distance of the object from the lens.

(2marks)

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48. (a)What is a **sound wave**? (1mark)

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(b)Write down three similarities between light waves and sound waves. (3marks)

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49. (a) Define the term **uniform speed**. (1mark)

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(b)(i) There are 80km between Jinja and Kampala. A taxi takes 50minutes to move from one town to another. Find its average speed in ms^{-1}. (2marks)

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50. (a)(i) What is meant by **anomalous expansion of water**? (1mark)

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(ii) State one practical importance of the anomalous expansion of water. (1mark)

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(b) In the space below, sketch a graph of density against temperature for water between $0^{o}c$ to $20^{o}c$. (2marks)

END