Thuto360 Revision Bank

Free practice for every learner in Botswana

MOCK PAPER

BGCSE Physics — Thuto360 mock paper

Physics · Form 5 · BGCSE

QUESTIONS	TOTAL MARKS	TIME ALLOWED
43	**54**	**120 minutes**

Name _____

Class / school _____

Date _____

Score _____ / 54

Instructions

A Thuto360 practice paper in the style of the national examination — not an official BEC paper.

Section A is multiple choice and is marked as soon as you hand in. Section B is written: your teacher marks it, or, if you are practising on your own, you mark it yourself against the marking guide.

Multiple choice: circle the letter of the right answer. Where it says "tick every correct answer", more than one is right. Written questions: answer on the lines given; the marks for each part are in brackets. The answers are on the last page.

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Section A — multiple choice

1. A motor does 1 200 J of work in 4 s. What is its power?

- (A) 300 W
- (B) 4 800 W
- (C) 1 204 W
- (D) 0.003 W

2. Which power station in Botswana generates electricity from coal?

- (A) Gaborone Dam
- (B) Kariba
- (C) Cahora Bassa
- (D) Morupule

3. Pressure = …

- (A) area ÷ force
- (B) force ÷ area
- (C) force × area
- (D) mass ÷ volume

4. Why do camels and tractors have wide feet or tyres?

- (A) To increase pressure
- (B) To look bigger
- (C) To go faster
- (D) To increase the area and reduce the pressure on soft ground

5. Pressure in a liquid increases with…

- (A) depth and density
- (B) the surface area of the liquid
- (C) the shape of the container only
- (D) colour

6. Which method of heat transfer happens mainly in fluids?

- (A) Conduction
- (B) Radiation
- (C) Convection
- (D) Insulation

7. Why are solar water heaters painted black?

- (A) Black reflects heat
- (B) Black conducts electricity
- (C) Black paint is cheaper
- (D) Black is a good absorber of radiation

8. The energy needed to change the state of a substance without changing its temperature is…

- (A) specific heat capacity
- (B) work
- (C) kinetic energy
- (D) latent heat

9. Wave speed = …

- (A) wavelength ÷ time
- (B) frequency × wavelength
- (C) frequency ÷ wavelength
- (D) amplitude × frequency

10. A wave has a frequency of 50 Hz and wavelength 2 m. What is its speed?

- (A) 25 m/s
- (B) 52 m/s
- (C) 100 m/s
- (D) 0.04 m/s

11. Sound cannot travel through…

- (A) steel
- (B) air
- (C) water
- (D) a vacuum

12. Which electromagnetic waves are used for mobile phones?

- (A) X-rays
- (B) Ultraviolet
- (C) Gamma rays
- (D) Microwaves

13. When light passes from air into glass, it…

- (A) does not bend
- (B) slows down and bends towards the normal
- (C) speeds up and bends away from the normal
- (D) stops

14. Total internal reflection is used in…

- (A) loudspeakers
- (B) transformers
- (C) optical fibres
- (D) plane mirrors

15. What is the combined resistance of a 6 Ω and a 3 Ω resistor in parallel?

- (A) 9 Ω
- (B) 2 Ω
- (C) 4.5 Ω
- (D) 18 Ω

16. Electrical power P = …

- (A) IR
- (B) V/I
- (C) VI
- (D) I/V

17. A 2 kW kettle is used for 30 minutes. How much energy does it use?

- (A) 60 kWh
- (B) 1 kWh
- (C) 0.5 kWh
- (D) 4 kWh

18. Which wire in a three-pin plug is green and yellow?

- (A) Earth
- (B) Fuse
- (C) Neutral
- (D) Live

19. What does a fuse do?

- (A) Increases the current
- (B) Melts and breaks the circuit if the current is too high
- (C) Changes AC to DC
- (D) Stores charge

20. A transformer works only with…

- (A) direct current
- (B) batteries
- (C) alternating current
- (D) permanent magnets only

21. A step-down transformer has 1 000 turns on the primary and 50 on the secondary. With 240 V in, what is the output?

- (A) 12 V
- (B) 120 V
- (C) 4 800 V
- (D) 24 V

22. Which device changes electrical energy into kinetic energy?

- (A) Transformer
- (B) Electric motor
- (C) Generator
- (D) Microphone

23. Which radiation is stopped by a sheet of paper?

- (A) Alpha
- (B) X-ray
- (C) Gamma
- (D) Beta

24. The half-life of a source is 6 hours. What fraction remains after 18 hours?

- (A) 1/6
- (B) 1/3
- (C) 1/2
- (D) 1/8

25. Which radiation is most penetrating?

- (A) Alpha
- (B) Beta
- (C) Gamma

26. A metre rule marked to the nearest 1 mm is used to measure length.

Which measurement can be accurately obtained using the metre rule?

(A) 0.3 m

(B) 0.34 m

(C) 0.343 m

(D) 0.3432 m

27. A car travels at a constant speed and the engine provides 24 kW of useful power. The driving force on the car is 600 N.

What is the speed of the car?

(A) 2.5 m/s

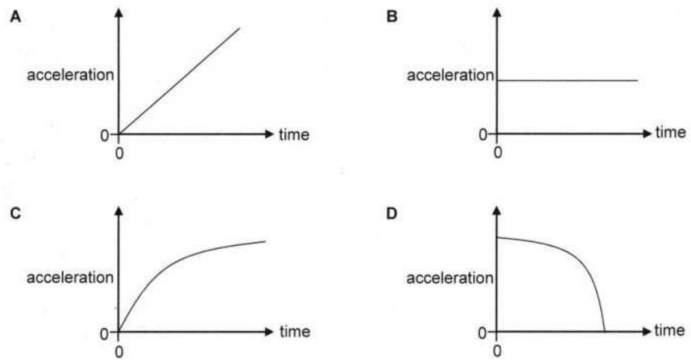
(B) 4.0 m/s

(C) 25 m/s

(D) 40 m/s

28. A stone falls freely from the top of a building.

Which graph shows the acceleration-time graph of the stone? Ignore air resistance.



(A) Graph A

(B) Graph B

(C) Graph C

(D) Graph D

29. A wooden block is pulled across a floor at a constant speed. There is a frictional force between the block and the floor.

Which statement is correct about the frictional force?

(A) It decreases as the block moves.

(B) It increases as the block moves.

(C) It is equal to the pulling force.

(D) It is less than the pulling force.

30. What is the name of the force that keeps objects moving in a circular path?

(A) centripetal

(B) couple

(C) friction

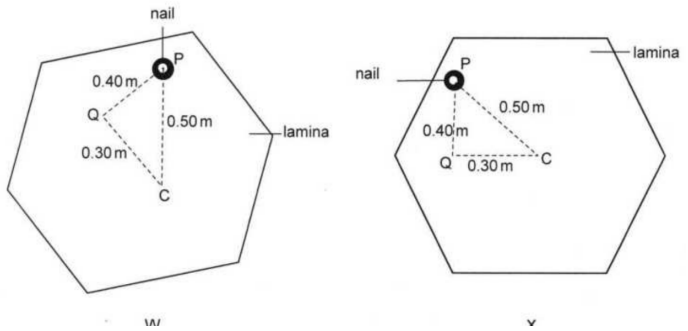
(D) gravitational

31. Diagram W shows a flat lamina suspended freely from a nail at point P. The centre of mass of the lamina is at point C. The lamina weighs 2.0 N.

Diagram X shows the same lamina rotated to the right until point Q is vertically below point P.

The diagram is not drawn to scale.

What is the moment that causes the lamina in diagram X to return to the position in diagram W?



(A) 0.60 Nm clockwise

(B) 0.80 Nm anticlockwise

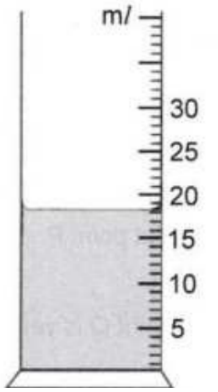
(C) 1.0 Nm clockwise

(D) 1.0 Nm anticlockwise

32. The acceleration due to gravity on a planet is 6.8 m/s².
An object of mass 5.0 kg is released from a height of 5.0 m.
What is the speed of the object when it hits the ground?

(A) 3.7 m/s
(B) 8.2 m/s
(C) 9.9 m/s
(D) 13.5 m/s

33. The diagram shows a liquid in a measuring cylinder. The mass of the liquid is 24 g.
What is the density of the liquid?



(A) 0.75 g/cm³
(B) 0.79 g/cm³
(C) 1.26 g/cm³
(D) 1.33 g/cm³

34. A student is investigating the evaporation of water from a beaker. The student can change: 1. the depth of the water, 2. the surface area of the water, 3. the temperature of the water.
Which changes would have an effect on the rate of evaporation?

(A) 1, 2
(B) 1, 3
(C) 2, 3
(D) 1, 2, 3

35. Pollen grains are suspended in a liquid and a bright light is shone on them. When observed under a microscope, the pollen grains are seen to be in continuous random motion.

What is the reason for this observation?

(A) convection currents in the liquid

(B) molecules of the liquid are colliding with the pollen grains

(C) pollen grains are colliding with each other

(D) pollen grains are floating in water

36. A thermometer has no scale.

Where must the bulb be placed so that 100 °C can be marked?

(A) in the freezer

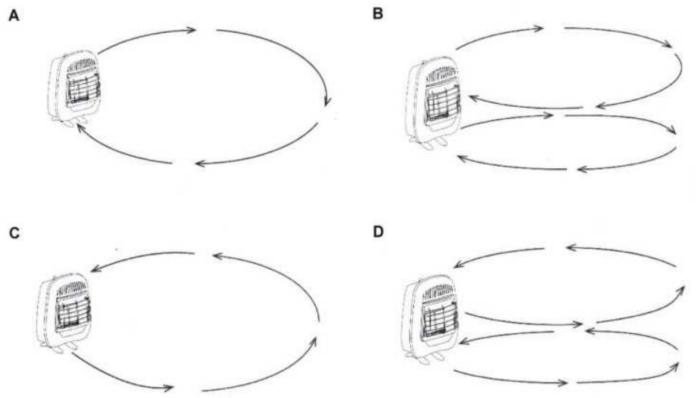
(B) in boiling tap water

(C) in melting ice

(D) in steam over boiling water

37. A heater is placed in a room.

Which diagram shows the movement of air as the room is heated?



(A) Diagram A

(B) Diagram B

(C) Diagram C

(D) Diagram D

38. A vacuum flask contains 150 g of water at 10 °C. The specific heat capacity of water is 4200 J/kg °C. The latent heat of fusion of water is 3.4×10^5 J/kg.

What mass of ice at 0 °C must be added to the flask to change the temperature of the water to 0 °C?

(A) 1.9 g

(B) 19 g

(C) 1.9 kg

(D) 19 kg

39. Four cylinders made of different materials are supplied with the same quantity of thermal energy.

Which cylinder has the greatest heat capacity?

	mass / kg	temperature rise / °C
A	1	4
B	2	8
C	3	2
D	4	6

(A) Cylinder A

(B) Cylinder B

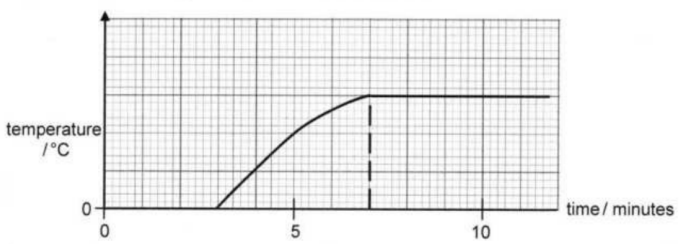
(C) Cylinder C

(D) Cylinder D

40. A block of ice is heated at a constant rate until it melts. The water is allowed to boil.

The graph shows how the temperature changes with time.

How many minutes does it take for all the ice to melt?



(A) 3 minutes

(B) 4 minutes

(C) 7 minutes

(D) 10 minutes

Section B — structured questions

41. A truck starts from rest and accelerates uniformly to 20 m/s in 10 s, travels at that speed for 30 s, then slows uniformly to rest in 20 s.

(a) Sketch the velocity–time graph. [2]

(b) Calculate the acceleration in the first 10 s. [1]

(c) Calculate the total distance travelled. [3]

42. A household uses a 1.5 kW electric stove for 2 hours and five 60 W bulbs for 5 hours every day. Electricity costs P1.20 per kWh.

(a) Calculate the energy used by the stove in a day, in kWh. [1]

(b) Calculate the energy used by the bulbs in a day. [2]

(c) Calculate the cost for 30 days. [2]

43. Explain how a vacuum flask keeps a hot drink hot.

(a) Conduction. [1]

(b) Convection. [1]

(c) Radiation. [1]

Answers

Check your work after you finish. Multiple-choice questions score only when every right answer is chosen.

1	A	**2**	D	**3**	B	**4**	D	**5**	A
6	C	**7**	D	**8**	D	**9**	B	**10**	C
11	D	**12**	D	**13**	B	**14**	C	**15**	B
16	C	**17**	B	**18**	A	**19**	B	**20**	C
21	A	**22**	B	**23**	A	**24**	D	**25**	C
26	C	**27**	D	**28**	B	**29**	C	**30**	A
31	A	**32**	B	**33**	D	**34**	C	**35**	B
36	D	**37**	A	**38**	B	**39**	C	**40**	A
41	See below	**42**	See below	**43**	See below				

Marking guide for written questions

Question 41

(a) [2] Rising line to 20 m/s at 10 s, flat to 40 s, falling to 0 at 60 s (2)

(b) [1] 20 ÷ 10 = 2 m/s² (1)

(c) [3] Area: ½ × 10 × 20 = 100 (1); 30 × 20 = 600 (1); ½ × 20 × 20 = 200; total 900 m (1)

Question 42

(a) [1] 1.5 × 2 = 3 kWh (1)

(b) [2] 5 × 0.06 kW (1) × 5 h = 1.5 kWh (1)

(c) [2] (3 + 1.5) × 30 = 135 kWh (1); × P1.20 = P162 (1)

Question 43

(a) [1] The vacuum between the walls stops conduction (1)

(b) [1] The vacuum stops convection; the stopper prevents convection currents leaving the top (1)

(c) [1] Silvered walls reflect infrared radiation back in (1)