GOVERNMENT BILINGUAL HIGH SCHOOL, YAOUNDE

MOCK GENERAL CERTIFICATE OF EDUCATION EXAMINATION

780 PHYSICS 1

APRIL 2021 **ADVANCED LEVEL**

Centre Number	
Centre Name	
Candidate Identification Number	
Candidate Name	

MULTIPLE CHOICE QUESTION PAPER

One and a half Hours

INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make you have an
HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Before the examination begins:

3. Check that this question booklet is headed **" Advanced Level—780 PHYSICS 1"**
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil; **Candidate Number and Name, Centre Number and Name.**

Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in
these instructions.

How to answer the questions in this examination

6. Answer **ALL** the **50** questions in this examination. All questions carry equal marks.
7. Calculators and Formulae booklets are allowed.
8. Each question has four suggested answers: A, B, C and D. Deicide which answer is appropriate. Find the number of
the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the
answer you have chosen.
For example, if C is your correct answer mark C as shown below.

[A] [B] [C] [D]

9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that
question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one answer. If you find a question difficult, move on to the next question.
You can come back to this question later.
11. Do all rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheets first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

SECTION I (Thirty five questions)

Question : 1 – 35

Directions: Each of the thirty five questions or incomplete statements in this section is followed by four suggested answers. Select the best answer in each case.

1. kgm^2s^{-3} are base units of,
   A Work .
   B Moment.
   C Power
   D Impulse.
2. Which of the following sets of physical quantities, X ,Y, and Z contain one vector and two scalar quantities ?

	X	Y	Z
A	Force	Torque	Momentum
B	Acceleration	Velocity	Electric Field Strength
C	Pressure	B-Field	Energy
D	Mass	Work	Temperature

3. Scientist recommend that the low power He-Ne LASER be used for school laboratory optical experiments. Their reasons could be that
   A It produces a coherent beam.
   B It is produced by the stimulated emission of radiation
   C It produces a beam of light of a single frequency. That is monochromatic beam.
   D It is for safety reasons

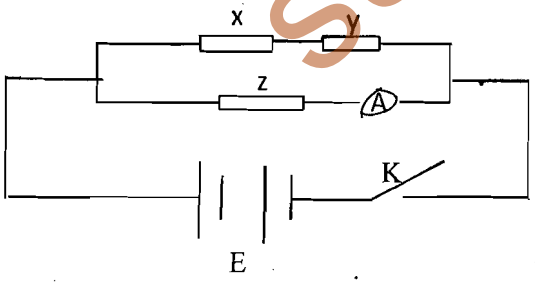


Figure I

4. Figure I shows how three identical resistors X, Y and Z may be connected in an electrical circuit.When the switch K is closed the current through the battery , E, is 4.5A. The reading of the ammeter of negligible resistance would be:
   A 3A.
   B 1.5A.
   C 2.25A.
   D 4.5A.
5. Light of wavelength 590 nm is incident normally on a grating of 8.0×10^5 lines per metre. The number of possible diffraction maxima obtained is
   A 5
   B 4
   C 3
   D 2
6. Which of the following wave types labeled A to D correctly matches its method of detection ?

	Wave Type	Method of Detection
A	Infra- red	Receiver aerials
B	Light	Photo cells
C	Gamma	Thermopiles
D	Radio	G.M Tubes

7. Which of the following statements about the motion of objects can NEVER be true ?
   A A body's speed can change without the object accelerating.
   B A body can be accelerating while moving at a constant speed.
   C A body can move as a result of a constant resultant force acting on it.
   D A body's velocity can change at constant speed.
8. Two ball bearings X and Y are dropped vertically from a height of 1 km above the earth's surface. They are initially at rest. The mass of Y is half that of X. Neglecting air resistance, which of the following statements is correct?
   A The time taken by x to reach the ground would be twice that taken by Y.
   B The time taken by X to reach the ground would be half that taken by Y.
   C Y would reach the ground before X.
   D The time taken by X and y to reach the ground will be the same.
9. Suppose a spring is loaded with a mass of 50×10^{-3} kg and it extends by 10×10^{-2} m. The force per unit displacement, K , and the period of oscillation are respectively,
   A 5.0 Nm^{-1} and 0.63 s
   B 5.0 Nm^{-1} and 0.314 s
   C 5.0 N and 0.63 s
   D 5.0 Ns^{-1} and 0.314 s.
10. Figure 2 below shows three resistors connected in a circuit. When the switch is closed, the P.d across the 30Ω resistor would be

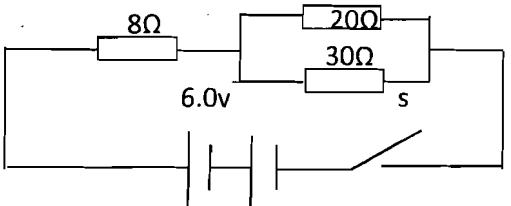


Figure 2

A 2.4 V

B 3.6 V

C 6.0 V

D 3.0 V

11. In an experiment to determine the velocity of sound in air, a vibrating tuning fork of an unknown frequency is struck and held over the end of an open tube and the shortest length which gives a loud sound is 15.0 cm. Assuming that the speed of sound in air at room temperature is 330 ms^{-1}, the possible frequency of the tuning fork is

A 515 Hz

B 256 Hz

C 550 Hz

D 220 Hz.

12. A snooker ball X moving with an initial velocity u, makes an elastic head-on collision with an identical stationary ball Y. Which of the sets of velocities below correctly gives the velocities of X and Y after the collision?

	X	Y
A	u/2	u/2
B	u	u
C	u	0
D	0	u

13.

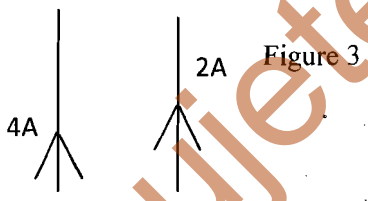


Figure 3

Figure 3 shows two long straight wires X and Y placed parallel to each other at a distance of 1m apart, carrying currents of 4 A and 2 A in the same direction. Which of ythe following gives the correct value of the B-Field due to the wires at a point midway between the wires if $\mu_0 = 4\pi \times 10^{-7} Hm^{-1}$

A 2.4×10^{-6} T

B 8.8×10^{-5} T

C 6.4×10^{-5} T

D 8.0×10^{-4} T

14. A piece of wire of young's modulus 2.0 x 1011Pa, of diameter 2.0 mm and of length 2.0 is suspended from a fixed point and a weight of 50 N is attached to its free end. If the elastic limit of the material is not exceeded, then the material would extend by

A 3.98×10^{-4} m

B 7.66×10^{-4} m

C 1.59×10^{-4} m

D 3.18×10^{-4} m

15. A 1 μF capacitor is charged using a constant current of 10 μA for 20 s. What is the energy finally stored by the

Capacitor?

A 2×10^{-3} J

B 2×10^{-2} J

C 4×10^{-2} J

D 4×10^{2} J

16. The earth exerts a force of 9.8 N on a 1 kg mass at its surface of radius R_E. Suppose the 1 kg mass is moved to a point at a height 3 times (thrice) the earth radius ($3R_E$) above the earth surface, then the force on the 1 kg mass becomes,

A 3.3 N

B 2.5 N

C 1.1 N

D 0.61 N

17.

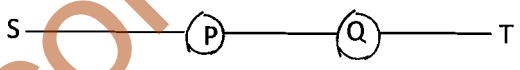


Figure 5

Figure 5 shows two point charges of magnitudes +2.4μC and +2.9μC located at points P and Q along a straight line ST.

A It is not possible for the resultant electric field due to these charges to be zero along the line between P and Q.

B The point where the resultant electric field due these charges is zero lies at a point midway between P and Q.

C The point where the resultant electric field due these charges is zero lies at a point between P and Q that is closer to Q than to P.

D The point where the resultant electric field due these charges is zero lies at G point between P and Q that is Closer to P than to Q.

18. A sample of gas has a volume of 1.5 x 10 m3 at a pressure of 3.0 x 10^5 Pa. Its new volume when the pressure is reduced by half at constant btemperature would be

A 0.75×10^{-3} m

B 4.5×10^{-3} m

C 3.0×10^{-3} m

D 1.5×10^{-3} m

19. The resistivities of copper and aluminum are 1.7 x 10^{-80} Ωm and 2.6 x 10^{-80} Ωm respectively. What would be the diameter of a copper wire which would have the same resistance and of equal length as that of the aluminum wire of diameter 1.5 mm?

A 1.85 mm

B 1.20 mm

C 3.4 mm

D 0.98 mm

20. Which of the following materials has a positive temperature coefficient of resistance ?

A Silicon
B Copper
C Carbon
D Wood.

21. A Toshiba TV set is rated at 1500W. How much is the cost of watching a football match which lasted for one and a half hour on this set if a unit of electricity by **eneo** is 60 francs?

A 9000 frs
B 90 frs
C 60 frs
D 135 frs.

22. One of the biggest advantage of fusion over fission as a source of energy is that fusion is an environmentally friendly source of energy. This means that

A Fusion occurs at extremely high temperatures
B Raw material for fusion is readily available and in abundance
C Waste products from fusion do not result in gene mutation
D Users of fusion power are friendly to each other.

23. Which of the following sets of statements is true for alpha, beta and gamma particles?

	Alpha-particle	Beta-particle	Gamma Rays
A	Affects a photographic plate	Does not affect a photographic plate	Affects a photographic plate
B	Undeflected by a B-field	Deflected by a B-field	Undeflected by a B-field
C	Deflected by an E-field	Deflected by an E-field	Undeflected by an E-field
D	Moves at light's speed	Moves at speed less than that of light	Have the same speed as light

24. When an electron in an atom makes a transition from an energy level at -1.5 eV to an energy level at -3.5 eV, an electromagnetic radiation occurs. If Planck constant is 6.6 x 10^{-34} Js and 1 eV is 1.6 10^{-19} J, then the type of electromagnetic radiation emitted is

A X- rays
B Radio waves
C Infra-red rays
D Visible.

25. A radioactive decay series that begins with $^{232}_{90}Th$ involves the emission in turns of the following: 2 alpha partricles and 2 beta particles. The final product is likely to be

A $^{224}_{88}Ra$
B $^{226}_{86}Rn$
C $^{227}_{85}At$
D $^{230}_{82}Pb.$

26.

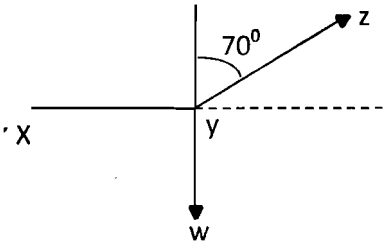


Figure 5

Figure 5 shows a weight W which hangs vertically from a spring XYZ by a thread tied to ythe spring at Y. The section XY is horizontal and section YZ is inclined at 70^0 to the vertical. The tension in the portion XY would be :

A W/tan70^0
B Wtan70^0
C Wtan20^0
D WSin70^0.

27. Which of the following statements about the potential energy and the force for two molecules is NOT true ?

A The potential energy and the force at infinity approximate zero.
B The potential energy is smallest at equilibrium separation.
C The potential energy and the force are equal at the equilibrium separation.
D At equilibrium separation the force between the molecules is zero.

28.

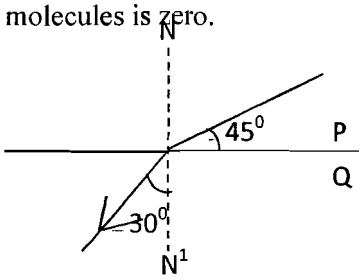


Figure 6

Figure 6 shows waves travelling from medium P to medium Q. if the velocity of the waves in medium Q is 2.0 x 10^{-1} ms^{-1} then the velocity of the waves in medium P would be

A 3.0 x 10^8 ms^{-1}
B 2.3 x 10^{-1} ms^{-1}
C 3.4 x 10^{-1} ms^{-1}
D 2.8 x 10^{-1} ms^{-1}

29.

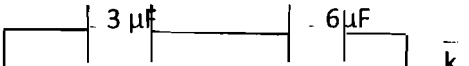


Figure 7 shows how a 3μF and a 6μF capacitors may be connected in a circuit in series with a 6V battery. Which of the following statements is NOT true for the circuit, when K is closed?

A The effective capacitance of the circuit is 2.0 x 10^{-6} F

B The total energy stored in the capacitors is 3.6 x 10^{-5} J

C The Pd across the 3μ is half the Pd across the 6 μF

D The pd across the 3μF is twice the pd across the 6μF

30. A meter has a resistance of 75 Ω and gives a full scale deflection of 1.0 x 10^{-3} A. In order to adapt this meter to read a current of 1 A it is necessary to connect

A	75 mΩ resistor in parallel with the meter
B	75 mΩ resistor in series withy the meter
C	75 Ω resistor in parallel with the meter
D	75 Ω resistor in series with the meter

31. A cylinder contains 12 litres of oxygen at 20^0C and 15 atmospheres. The temperature is raised to 35^0C and the volume is reduced 8.5 litres. The final pressure of the gas in atmospheres is:

A	20.1 atm
B	11.2 atm
C	22.3 atm
D	22.5 atm

32. Which of the following statements about a bipolar transistor is true?

A The collector current is always greater than the base current.

B The emitter current is always less than the collector current.

C The base –emitter voltage is always equal to the input voltage .

D The base current is greater than the collector current.

33. When a parallel beam of light is incident at the Brewster's angle in air on the surface of a glass block, some of the light is reflected and some refracted . Which of the following statements about these rays is true ?

A Both the refracted and the reflected rays are completely plane polarized.

B The angle between the refracted ray band the reflected ray is 90^0

C The refracted ray and the incident ray are at right angles to each other.

D Only the refracted ray is plane polarized.

34. Which of the following statements is true for Young's double slit experiment ?

A Doubling the slit spacing only would double the fringe separation.

B Doubling both the slit- screen distance and the slit separation would decrease the fringe separation.

C Reducing the slit width by half only would double the fringe separation.

D Changing the slit width has no effect on the fringe separation.

35.

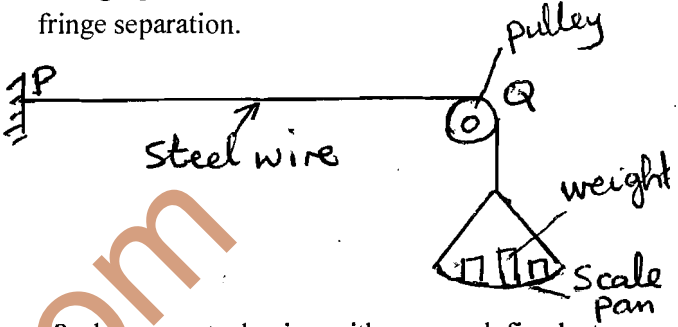


Figure 8 shows a steel wire with one end fixed at point While the other end is passed over a pulley Q and attached to the scale pan carrying weights. Which of the following statements is true about the speed of transverse waves in the section PQ of the wire ?

A	The speed increases with increase in the radius of the wire
B	The speed increases with decrease in the weight put in the scale pan
C	The speed increases with increase with increase in the weight put in scale pan
D	The speed does not depend on the thickness of the wire.

SECTION B (Ten questions) Multiple Selection Questions 36 – 45

Directions : ***For each group of question below, ONE or TWO of the responses given is/are correct. Then choose*** :

A If 1 and 2 are corect

B If 2 and 3 are correct

C If 1 only is correct

D If 3 only is correct

Directions Summarized			
A	B	C	D
1,2 only	2,3 only	1 only	3 only

36. Which of the following statements is/are true for an Electric field ?

1. The lines of force originate from the negative charge and terminate on the positive.
2. The lines of force are usually smooth curves which touch each other.

3. The strength of the Electric field can be measured from the density of the lines.

37.

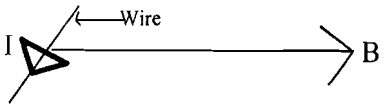


Figure 9

Figure 9 shows a horizontal length of current-carrying copper wire, placed in the plane of the paper; containing a uniform magnetic field such that the wire is perpendicular to the field. If the current flowing through the wire is 28 A and the mass per unit length of the wire is 46.6 gm^{-1}, then

1 The current-carrying wire can be made to float in the magnetic field as shown in figure 9.

2 The magnitude of the minimum magnetic field needed to suspend the wire is 1.6×10^{-2} T.

3 The direction of the field needs to to be reversed for the wire to float or be suspended.

38. The half-life of a radioactive nuclide is :

1 A fundamental property of the nuclei.

2 A function of its mass.

3 Depends on its atomic number.

39. If the collision between two bodies x and y is described as elastic, this would mean that ,

1 The relative speed of separation is equal to the relative of approach between the two bodies.

2 The total energy of the system is conserved.

3 The impulse is continuously changing.

40.

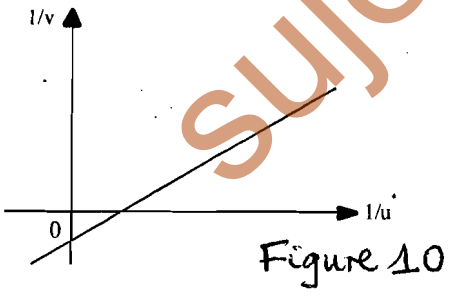


Figure 10

Which of the following statements is/are correctly deduced from the graph of figure 10 ?

1	The slope of the graph is the focal length of the lens.
2	The slope of the graph is the reciprocal of the focal length
3	The intercept of the graph is the reciprocal of the focal length

41. Which of the following sets of quantities X and vary according to the inverse-square law?

	X	Y
1	Potential energy due to a point charge	Distance from the point charge
2	Force of attraction between two charges	Distance between the masses
3	The Electric-field due to a point charge	Distance from the point charge

42. Which of the following statements is/are true about forces ?

1 Gravitational and Magnetic forces are both action-at-a-distance forces.

2 All action-at-a-distance forces obey the inverse-square law.

3 All forces between elementary particles and friction are contact forces.

43. The speeds of five molecules in ms^{-1} are 10, 20, 30, 40 and 50 respectively. Which of the statements is/are true about the speeds of the molecules?

1 The mean square speed of the molecules is 90 ms^{-1}.

2 The root-mean-square speed of the molecules is 74 ms^{-1}.

3 The mean square speed of the molecules is always greater than the root-mean-square speed.

44. Which of the following statements is/are true of a coherent beam of light?

1 Their rays have the same colour.

2 The phase different between the wave fronts is constant.

3 The waves must originate from two monochromatic sources.

45. Which of the following pairs of statements correctly matches energy losses in a transformer with its method of reducing energy loss?

	Energy Losses	**Method of reducing energy loss**
1	Heat losses in the connecting wires	Use wires of large diameter
2	Hysteresis losses	Replace iron with steel in the core
3	Flux leakages	Laminate the core

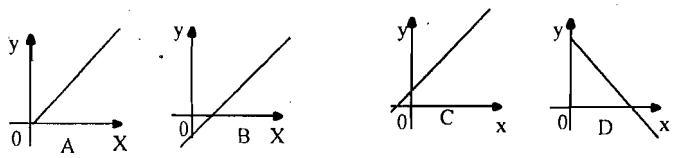
SECTION III (Five questions)

Questions 46—50.

Direction : ***Each of the questions {46-50) has four sets of graphs A – D. Which of the graphs in each question best fits the relationship between X and Y?***

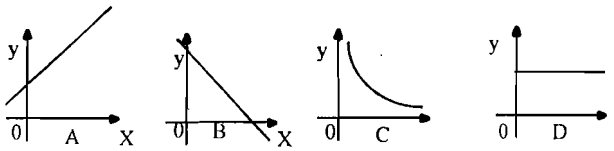
46.

	Y	X
	The volume of a fixed mass of gas at constant pressure.	Temperature in degrees Celsius.



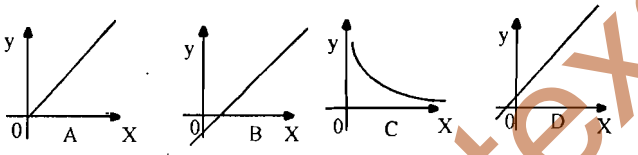
47.

	Y	X
	Natural log of the pd across the plates of a discharging capacitor.	Time.



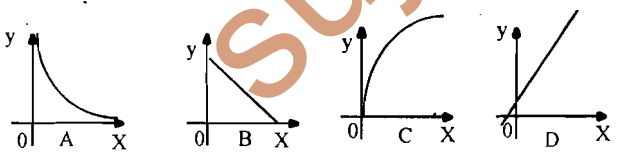
48.

	Y	X
	The stopping potential for photoelectrons.	Frequency of incident radiation.



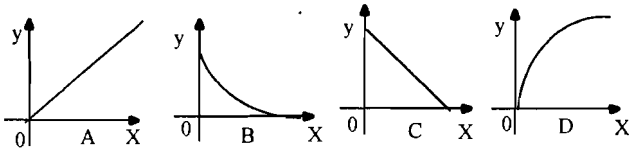
49.

	Y	X
	Resistance of Thermistor.	Temperature in degrees Celcius.



50.

	Y	X
	Conductivity of Silicon	Temperature



STOP! NOW GO BACK AND CHECK YOUR WORK