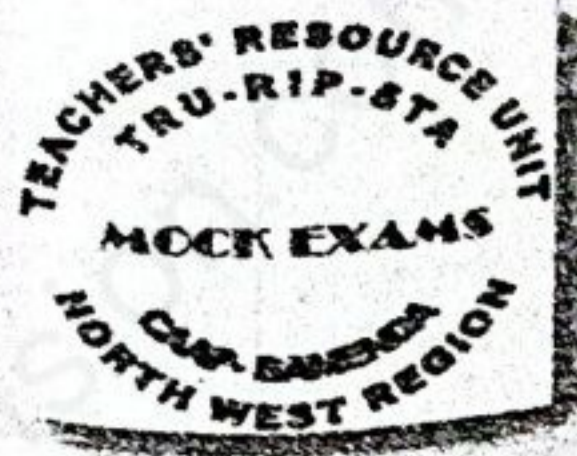


REPUBLIQUE DU CAMEROUN
Paix-Travail-Patrie

MINISTERE DES ENSEIGNEMENTS SECONDAIRES

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REPUBLIC OF CAMEROON
Peace-Work-Fatherland

MINISTRY OF SECONDARY EDUCATION

TEACHERS' RESOURCE UNIT
REGIONAL BRANCH FOR THE NORTH WEST

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MARCH 2022

The Teachers' Resource Unit and the Regional Inspectorate of Pedagogy, in collaboration with NWAPT	SUBJECT CODE NUMBER 0780	PAPER NUMBER 1
GENERAL CERTIFICATE OF EDUCATION REGIONAL MOCK EXAMINATION	PHYSICS	
CANDIDATE NAME:		
CANDIDATE NUMBER:		
CENTRE NUMBER:		
ADVANCED LEVEL		

Time Allowed: One and a half hours
INSTRUCTIONS TO CANDIDATES:

Mobile phones are **NOT ALLOWED** in the examination room.

1. USE A SOFT HB PENCIL THROUGHOUT THIS 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 -0780 code and subject title—PHYSICS Paper 1".
4. Insert the information required in the spaces above.
5. Without opening the booklet, pull out the answer sheet carefully from inside the front cover of this booklet. 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.
6. Insert the information required in the spaces provided on the answer sheet using your HB pencil:

Candidate Name, Centre Number, Candidate Number, Subject Code Number, and Paper number

How to answer questions in this examination:

7. Answer ALL the 50 questions in this examination. All questions carry equal marks.
8. Non-programmable calculators are allowed.
9. For each question there are four suggested answers, A, B, C and D. Decide which answer is correct. 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]
10. Mark only one answer for each question. If you mark more than one answer, you will score zero for that question. If you change your mind about an answer, erase the first mark carefully, and then mark your new answer.
11. Avoid spending much time on any question. If you find a question difficult, move to the next question. You can come back to this question later.
12. Do all rough work in this booklet using, where necessary, the blank spaces in the question booklet.
13. You must not take this booklet and answer sheet out of the examination room. All question booklets and answer sheets will be collected at the end of the examination.

SECTION I (Thirty five questions)

Questions 1-35

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

- 1) Which of the following is correct?
 A. A non-homogeneous equation may be physically correct
 B. A homogeneous equation must be physically correct
 C. A non-homogeneous equation must be physically incorrect
 D. A homogeneous equation must be physically incorrect

- 2) If a stone tied to a string is whirled to move in a vertical circle at a constant speed v , then:
 A. the string is most likely to break when the stone is vertically below the center of the circle
 B. the tension in the string is maximum when the stone is vertically above the center of the circle
 C. the sense of the acceleration changes with the direction of the velocity
 D. If the string breaks, the stone will continue to move in a circular path

- 3) The amount of energy needed to convert 1.2 kg of pure water at 60°C to steam under standard atmospheric pressure in joules is
 A. 201600
 B. 2712000
 C. 2913600
 D. 2510400

- 4) For a moving coil meter to function properly, the pointer needs to make a swing and then rapidly return to the equilibrium position. The kind of damping necessary to achieve this is
 A. Light damping
 B. Critical damping
 C. Heavy damping
 D. No damping

- 5) The net force acting on the object R in figure 1 below is

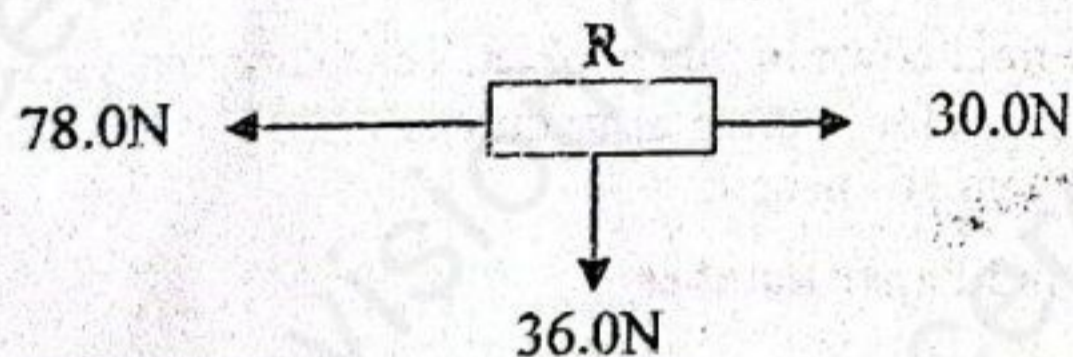


Figure 1

- A. 60.0 N, south west of R
 B. 48.0 N, west of R
 C. 36.0 N, south of R
 D. 84.0 N, south west of R

- 6) An electric field consists of a region between two metal plates separated by a distance d across which a pd V is maintained. The work done by the electric field to accelerate a charge of $+3e$ through a distance of $2x$ in the field is

- A. $\frac{eVx}{d}$
 B. $\frac{3eVx}{d}$
 C. $\frac{2eVx}{d}$
 D. $\frac{6eVx}{d}$

- 7) The magnitude of the force between two point charges maintained a distance r apart is F . If each of the charges is doubled and their separation apart increased to $3r$, the force between them becomes:

- A. $\frac{2F}{3}$
 B. $\frac{4F}{3}$
 C. $\frac{4F}{9}$
 D. $\frac{2F}{9}$

- 8) A ball is thrown vertically into the air with an initial velocity u . The time it takes to return to the point of projection is:

- A. $\frac{u^2}{2g}$ B. $\frac{u}{g}$ C. $\frac{u}{4g}$ D. $\frac{2u}{g}$

- 9) A mass attached to a vertical string is made to undergo simple harmonic oscillations. Which of the statement below is correct

- A. The direction of its acceleration is constantly changing
 B. When its pe is increasing, its ke is reducing and vice versa
 C. The total mechanical energy of the system varies sinusoidally
 D. The closer the mass is to its equilibrium position, the greater is its acceleration

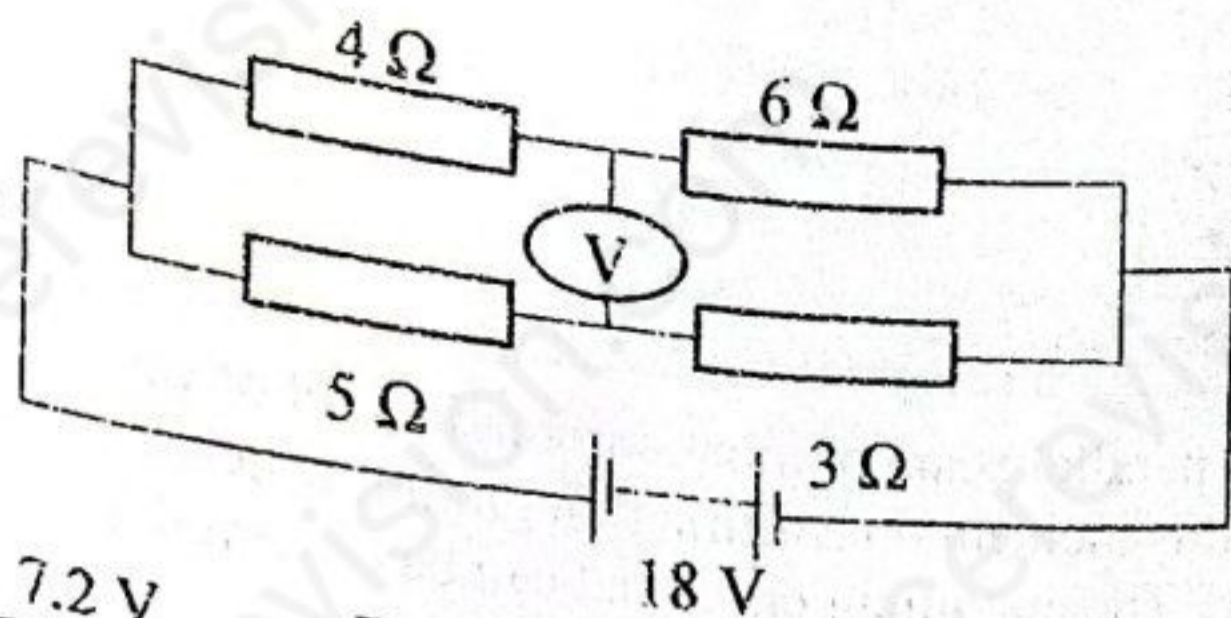
- 10) The colors of light blue, yellow, violet and orange in order of increasing wavelength is

- A. Orange, yellow, blue, violet
 B. Violet, yellow, blue, orange
 C. Orange, blue, yellow, violet
 D. Violet, blue, yellow, orange

- 11) A radioisotope has a half-life of 36 minutes and an initial activity of 1800 counts/s. Its activity after $2\frac{1}{2}$ hours is

- counts/s is
 A. 100.2
 B. 112.5
 C. 56.3
 D. 50.1

- 12) The reading of the voltmeter in the circuit in figure 2 below is
 Figure 2



- 12) The voltmeter reading is
- A. 7.2 V B. 11.3 V C. 15 V D. 4.1 V

13) A beam of green light causes the emission of photoelectrons when used to illuminate a metal surface. If the metal surface were illuminated with red light whose intensity is greater than that of the green light, the observations will be:

	Photoelectric current	Stopping potential
A	Increases	decreases
B	Decreases	Remains constant
C	Increases	increases
D	Remains constant	decreases

14) A capacitor of capacitance $120 \mu\text{F}$ is charged by a 9.0 V battery through a resistor of $80 \text{ k}\Omega$. The time taken for the capacitor to acquire 75% of its final charge in seconds is

A. 9.9 B. 6.7 C. 13.3 D. 13.8

15) When washing tomatoes in water of density 1000 kg/m^3 , it is found that a particular fruit floats such that only 15% of its volume is above the water. The density of the fruit in kg/m^3 is

A. 750. B. 650. C. 850. D. 150.

16) A small metal sphere is dropped into a deep tank of liquid where it experiences a retarding force F which is directly proportional to its velocity v . The correct statement about the movement of the ball is

A. The rate of change of its vertical velocity will remain constant

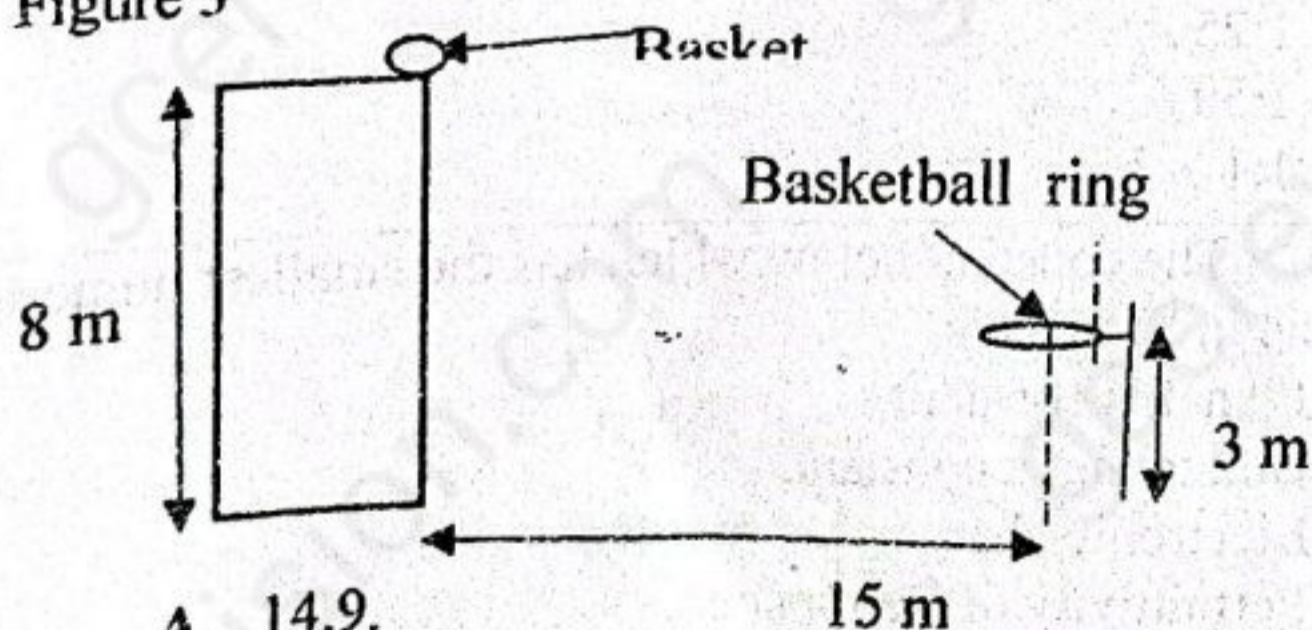
B. The ke of the ball continually increases as it falls

C. The momentum of the ball remains constant

D. The rate of change of its momentum will gradually reduce to zero

17) The horizontal speed, in meters per second, with which the basketball at the top of the storey building in figure 3 below should be kicked so that it just passes through the basketball ring is:

Figure 3



- A. 14.9.
B. 11.7.
C. 19.2.
D. 8.2.

18) A car traveling at 15 ms^{-1} collides with a wall and stops abruptly. The force exerted on a passenger by the seat belt is 4800 N . The mass of the passenger in kg if she was brought to rest in 0.25 s

- A. 60
B. 120
C. 80
D. 72

19) The property of the helium-neon laser which makes it particularly desirable as a school laboratory apparatus is that it

- A. produces monochromatic light.
B. is low powered.
C. produces a highly directional beam.
D. produces a coherent beam.

20) The set of physical quantities below that is made up of only vectors is

- A. field strength, power, current.
B. field strength, torque, impulse.
C. moment, weight, intensity.
D. tension, inertia, momentum.

21) A piece of cardboard having an area of 4 cm^2 is placed between a thin convex lens and a wall perpendicularly to the principal axis of the lens such that an image of the cardboard of area 25 cm^2 is formed on the wall. Given that the cardboard is 24 cm from the lens, then its focal length in cm is

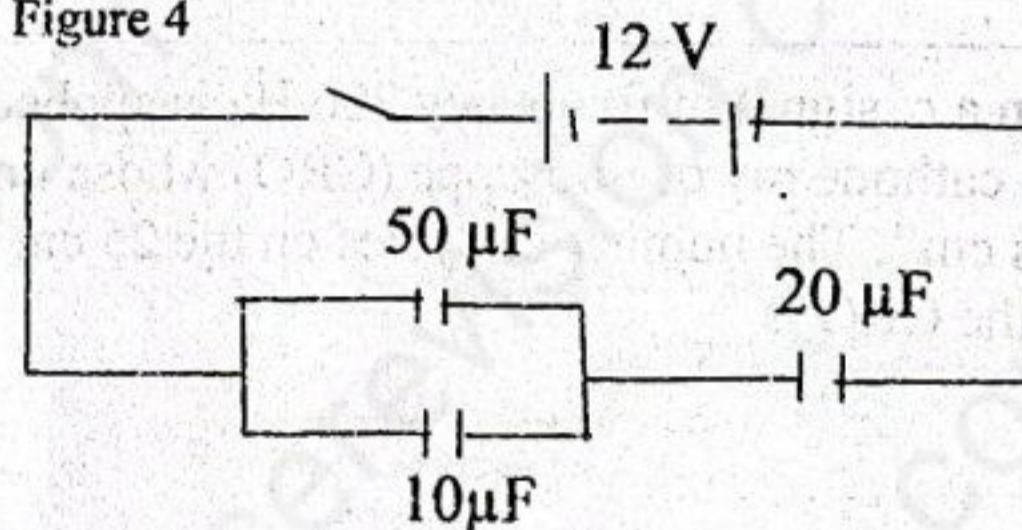
- A. 20.1.
B. 17.1.
C. 25.6.
D. 18.2.

22) The least distance between two points on a progressive wave having a phase difference of 6π is 0.150 m . If the frequency of the wave is 400 Hz , the speed of the wave in m/s is

- A. 20.0.
B. 0.5
C. 200.0.
D. 5.0.

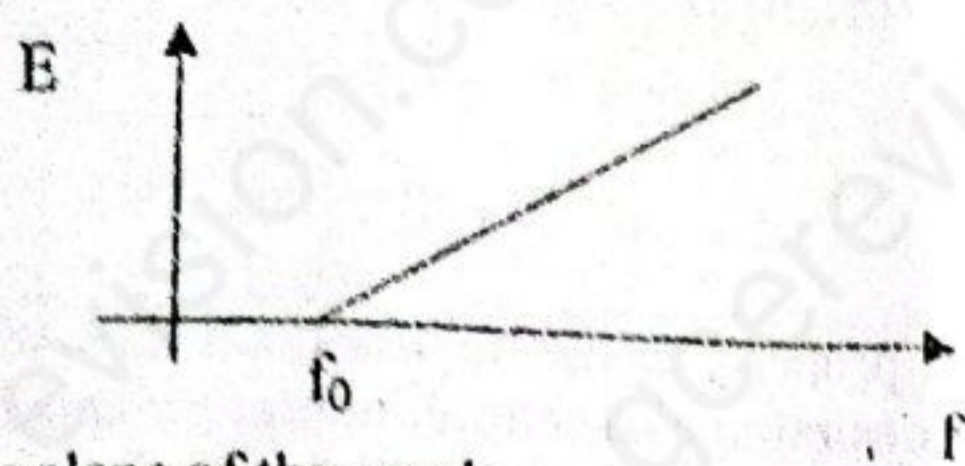
23) If the switch in Figure 4 is closed,

Figure 4



- A. The total capacitance is $28.3 \mu\text{F}$
- B. The pd across the $20 \mu\text{F}$ capacitor will be three times that across the $10 \mu\text{F}$ capacitor
- C. The same charge is stored in the $50 \mu\text{F}$ and $10 \mu\text{F}$ capacitors
- D. The energy stored in the $10 \mu\text{F}$ capacitor is 5 times that stored in the $50 \mu\text{F}$ capacitor

24) Figure 5 shows how the maximum kinetic energy of photoelectrons varies with the frequency of incident radiation for a metal. Which of the following is NOT true?
Figure 5



- A. h is the slope of the graph
 B. The slope does not depend on the metal used
 C. The slope depends on the intensity of the radiation
 D. f_0 depends on the metal used

25) A motorist runs at a constant speed of 18 ms^{-1} towards a stationary source emitting a sound of frequency 1200 Hz . Given that the speed of sound in air is 330 ms^{-1} , the frequency of the sound perceived by the motorist in Hz is

- A. 1134.
 B. 1296.
 C. 1138.
 D. 1265.

26) In a step index optical fibre, the refractive indices of the core and cladding are respectively 1.56 and 1.47. The critical angle of the boundary in degrees is

- A. 19.9.
 B. 42.9.
 C. 39.
 D. 70.4.

27) A narrow coil of 40 turns and area $5 \times 10^{-2} \text{ m}^2$ is placed so that its axis is perpendicular to a magnetic field of flux density $4 \times 10^{-2} \text{ T}$. The emf induced in the coil in volts if it is completely removed from the field within 0.2 s is

- A. 1.0×10^{-2} .
 B. 4.0×10^{-1} .
 C. 5.0×10^{-5} .
 D. 1.6×10^{-2} .

28) An a.c. signal of frequency 200 Hz is applied to the Y plates of a cathode ray oscilloscope (CRO) whose time base is set at 1 ms cm^{-1} . The number of cycles on the 25 cm wide screen of the CRO is

- A. 4.
 B. 5.
 C. 6.
 D. 7.

29) A particle of charge q and mass m is accelerated from rest through a pd V . if Planck's constant is h , then the De Broglie wavelength is

- A. $\frac{h}{\sqrt{2qmv}}$
 B. $\frac{h}{mv}$

- C. $\frac{2h}{qmv}$
 D. $\frac{h^2}{2qmv}$

30) A parallel beam of monochromatic light of wavelength 490 nm is incident on a diffraction grating which has 5×10^5 lines/m. The maximum order that can be observed is

- A. 1.
 B. 2.
 C. 3.
 D. 4.

31) The nucleon number of a parent nucleus is greater than that of the daughter nucleus by 8, while the atomic number of the parent nucleus is greater than that of the daughter nucleus by 1. The number of α -particles and β -particles that were emitted in the complete decay series from the parent to the daughter nucleus is

	A	B	C	D
α -particles	2	3	1	2
β -particles	1	2	2	3

32) The gravitational field strength on the surface of a newly discovered heavenly body is $\frac{75}{32}$ times that on the earth's surface. If its mass is $\frac{3}{8}$ that of the earth, the ratio of the earth's radius to that of the planet is

- A. 2:5 B. 3:2 C. 5:2 D. 2:3

33) A body X of mass m moving with a velocity v , makes an elastic head-on collision with a stationary body Y of equal mass m . The velocities of X and Y after the collision is

	X	Y
A	$v/2$	0
B	$v/2$	$v/2$
C	0	$v/2$
D	0	v

34) If a current of 5.0 A is passed through a coil of inductance 100 mH and resistance 0.1Ω , the ratio of the energy stored to the energy dissipated in 10 s is

- A. 1:20
 B. 1:25
 C. 1:50
 D. 1:1

35) The constant below which has the smallest numerical value in SI units is

- A. Planck's constant.
 B. Boltzmann's constant.
 C. Electronic charge.
 D. Permittivity of free space.

SECTION II (ten questions)

Multiple Selection

Questions 36-45

Directions: For each of the questions or incomplete statements in this section ONE or TWO of the responses given is/are correct. Decide which of the responses is/are correct. Then choose

- A, if 1 and 2 are correct
- B, if 2 and 3 are correct
- C, if 1 only is correct
- D, if 3 only is correct

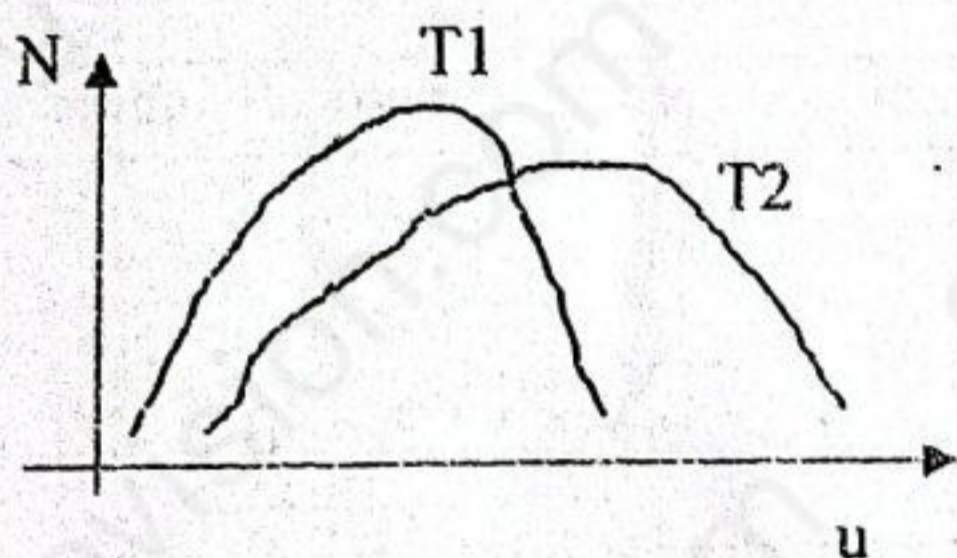
Directions summarized			
A	B	C	D
1 and 2	2 and 3	1 only	3 only

36) A transformer has an efficiency of 80%. The relationship(s) that is/are true, where N is number of turns, I is current, V is voltage and the subscripts p and s stand for primary and secondary respectively is/are

- 1) $N_s = \frac{4N_p I_p}{5I_s}$
- 2) $V_s = \frac{I_p V_p}{0.8I_s}$
- 3) $N_s V_s = N_p V_p$

37) Figure 6 shows the distribution of gas speeds u at different temperatures T₁ and T₂

Figure 6



The correct statements below is/are

- 1) The velocity at the peak of each curve is the root mean square velocity
- 2) $T_2 > T_1$
- 3) The area under both curves is the same

38) When two bodies A and B are in thermal equilibrium with each other, it implies that

- 1) No energy flows from one object to the other.
- 2) A and B are at the same temperature.
- 3) Exchange of heat between A and B is balanced.

39) For a fuse to function properly

- 1. It must have a low temperature coefficient of resistance.
- 2. Its resistance must vary with the current through it.
- 3. It must melt when a certain current flows through it.

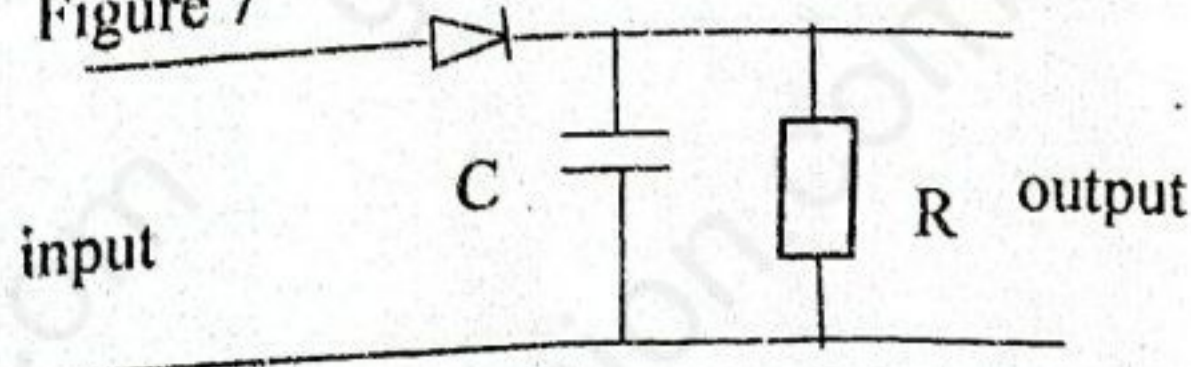
40) The quantity of solar energy received at any point on the earth's surface depends on

- 1. Geographical location.
- 2. Period or season of year.

3. The number days in a month.

41) Figure 7 shows a half-wave rectifier with a load R and a capacitor C

Figure 7



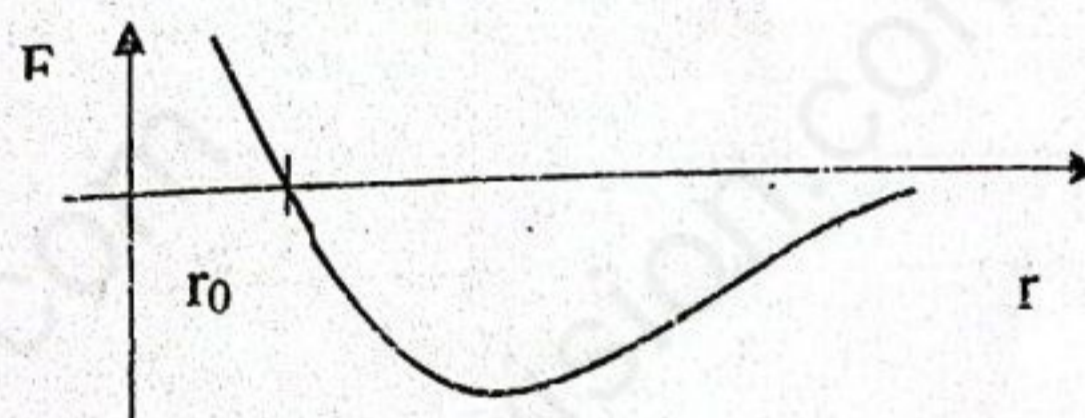
- 1. The capacitor serves as a reservoir of charge.
- 2. The capacitor serves to smoothen the output voltage.
- 3. The capacitor eliminates any dc current from the input circuit.

42) The force acting on a conductor in a magnetic field can be reduced by

- 1. Increasing the speed of the conductor.
- 2. Reducing the strength of the magnetic field.
- 3. Reducing the length of the conductor.

43) Figure 8 below shows how the net force F between a pair of molecules varies with their separation r.

Figure 8



From the figure, it is true that:

- 1. When $r = r_0$, the molecules are at rest
- 2. The potential energy of the molecules has its minimum value at r_0
- 3. When $r < r_0$, the net force is repulsive

44) Some essential components of a potentiometer is/are:

- 1. A sensitive galvanometer
- 2. A wire of uniform cross sectional area
- 3. A cell capable of maintaining a constant current in the wire

45) For a point charge:

- 1. The field intensity decreases with distance according to the inverse square law
- 2. The field is uniform
- 3. The field has different strengths at equal distances from the charge

SECTION III (Five questions)

Questions 46-50

Directions: Each of the questions (46-50) has four graphs labeled A to D. Write down the letter that corresponds to the graph that best fits the relationship between x and y.

46)

Y	X
Acceleration of a simple harmonic oscillator	Displacement from equilibrium position

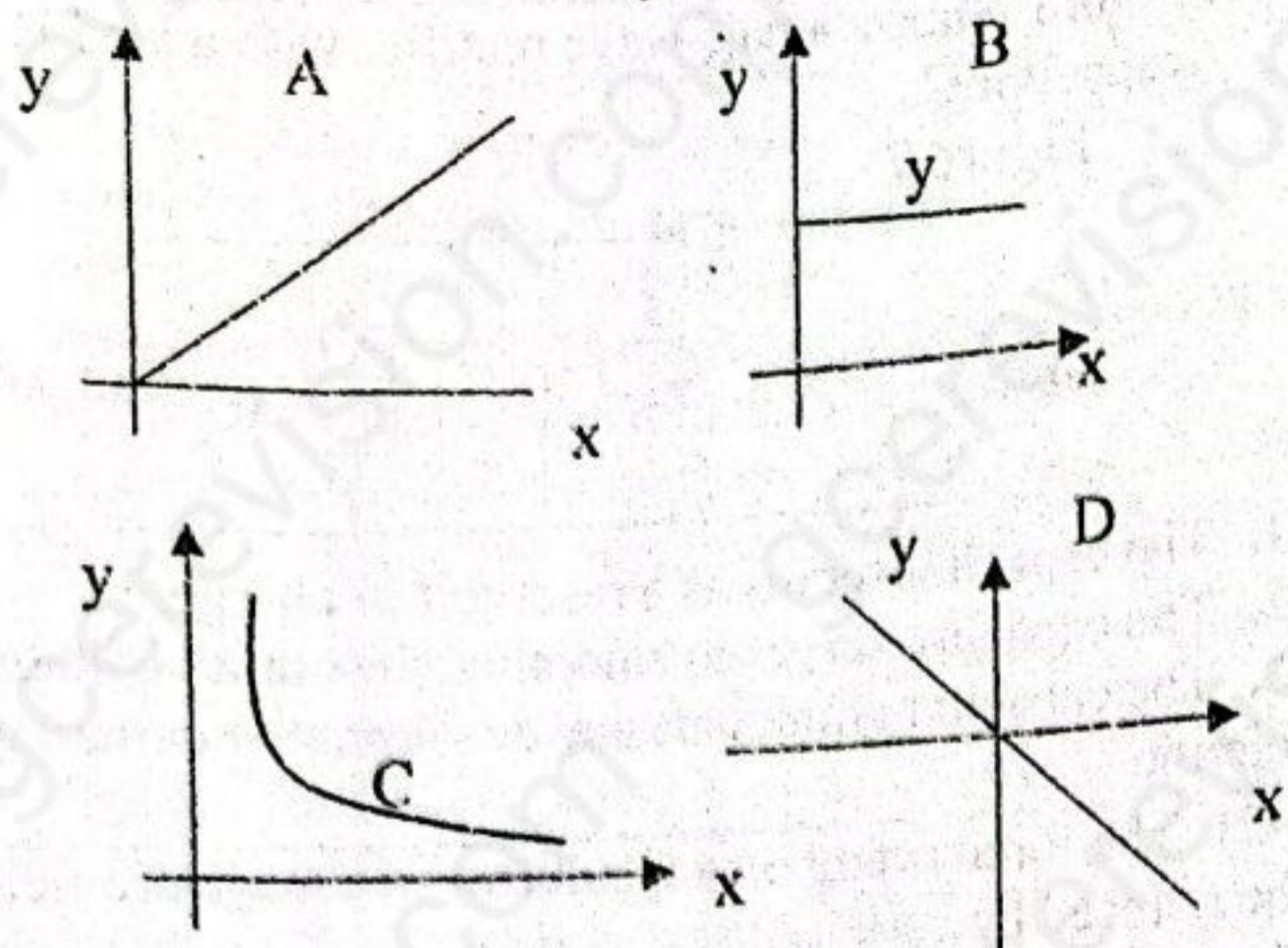


Figure 9

47)

Y	X
natural logarithm of the activity of a radioisotope	time

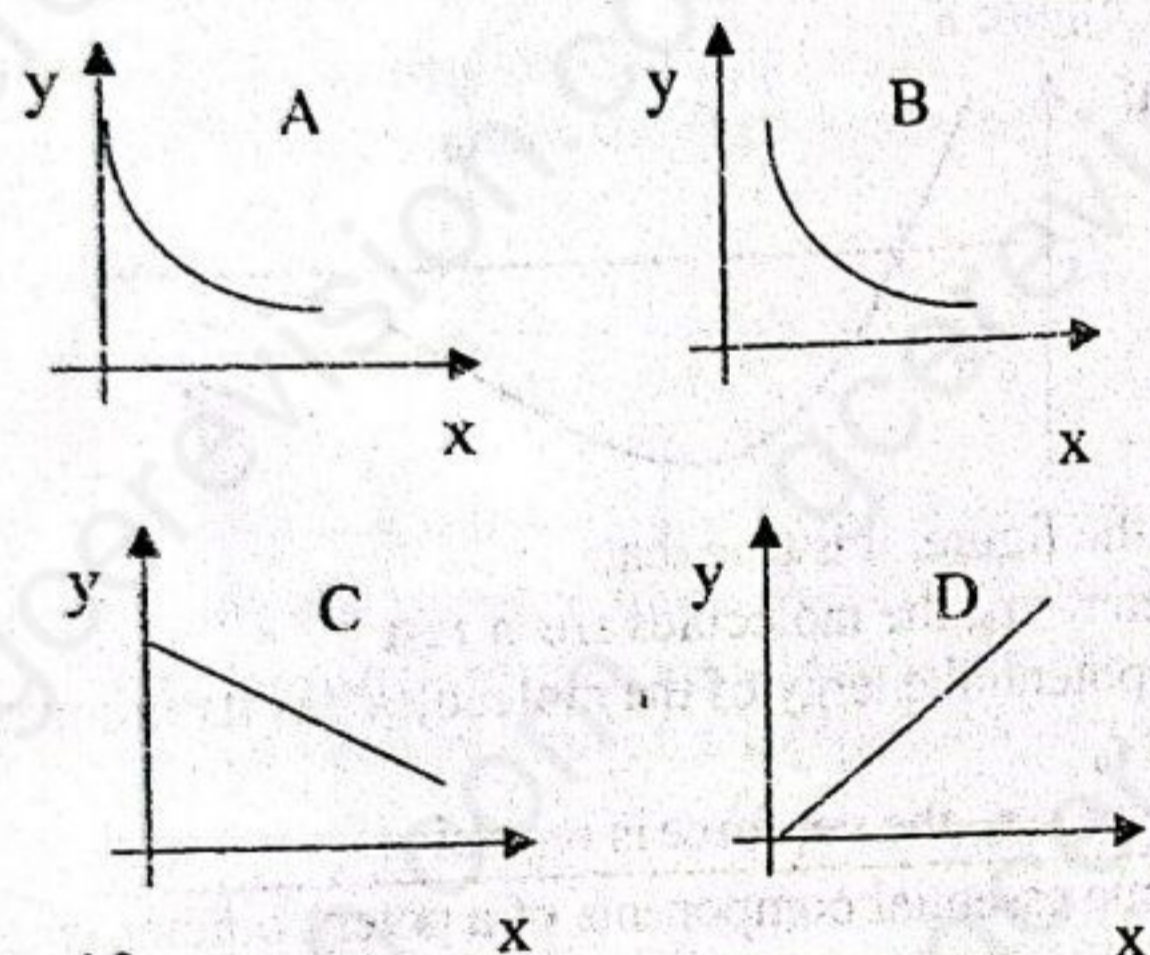


Figure 10

48)

Y	X
Fringe separation in Young's double slit experiment	Reciprocal of slit separation

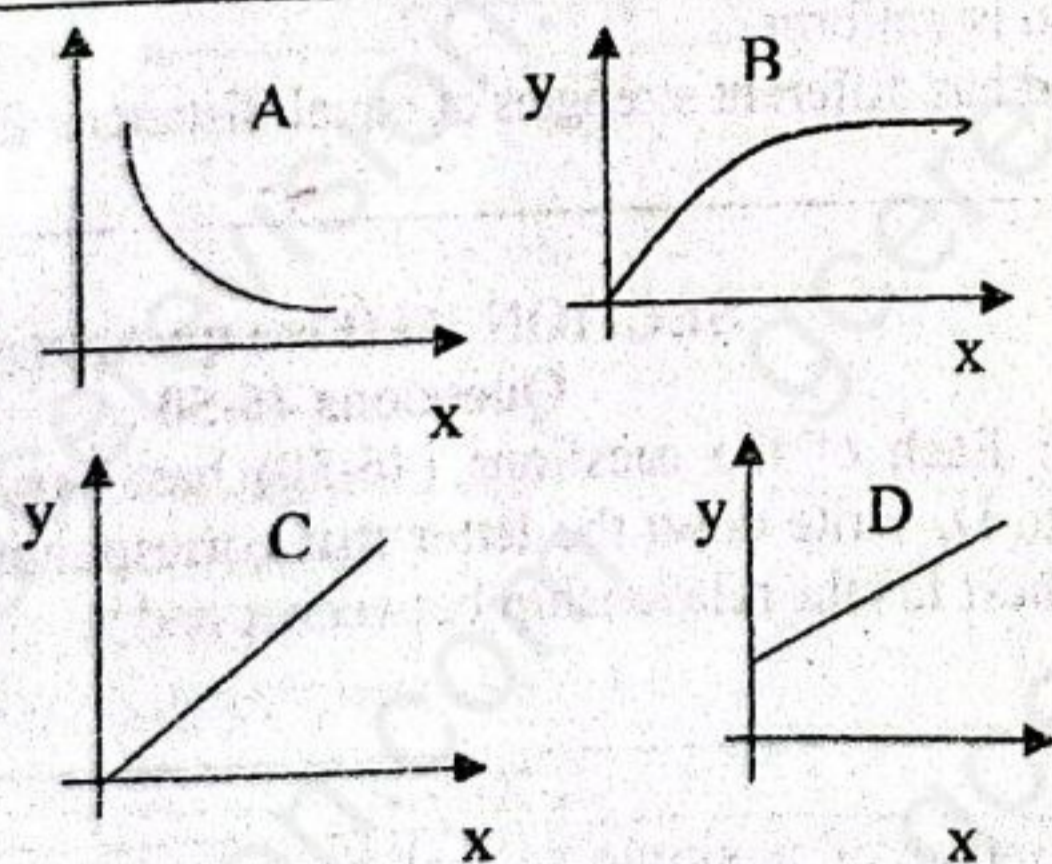


Figure 11

49)

Y	X
Resistance of a thermistor of negative temperature coefficient of resistance	temperature

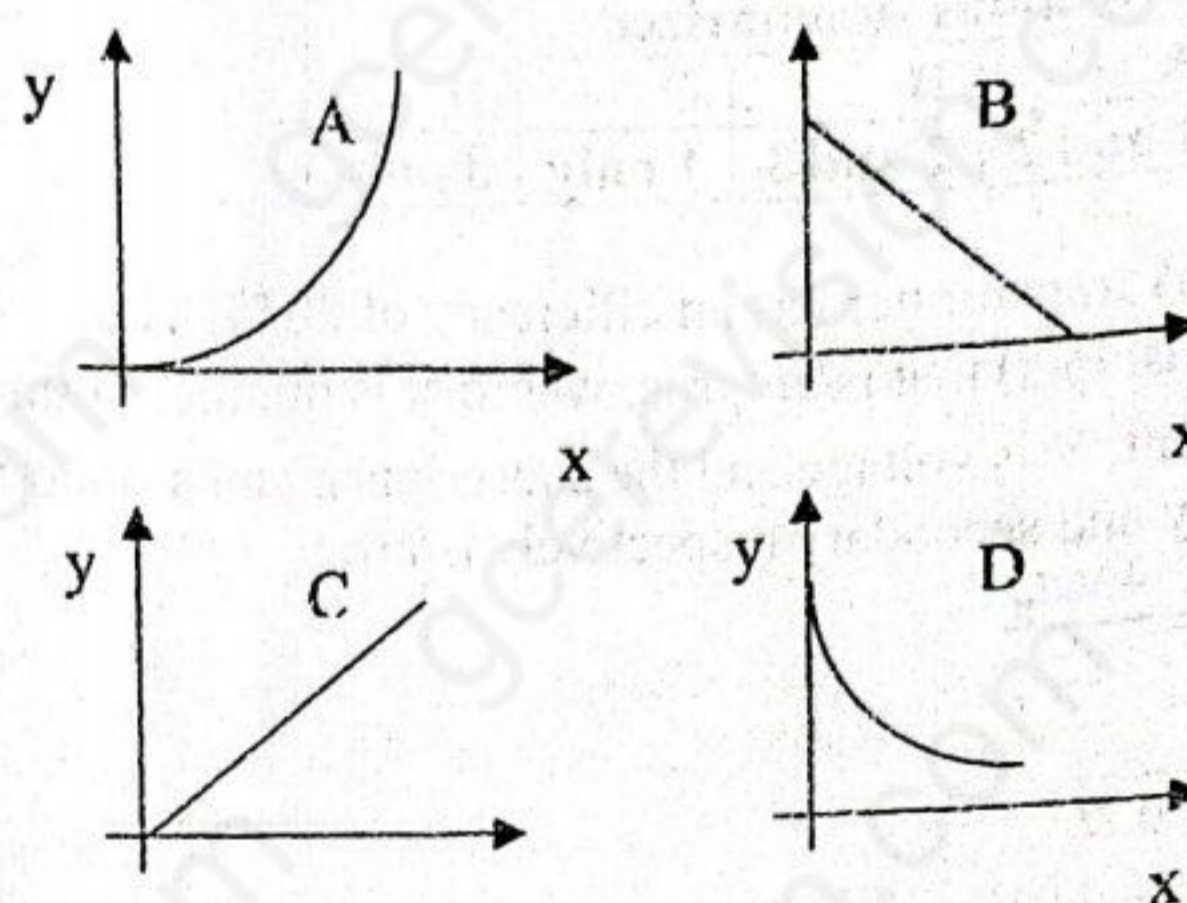


Figure 12

50)

Y	X
Acceleration of stone projected vertically upwards	time

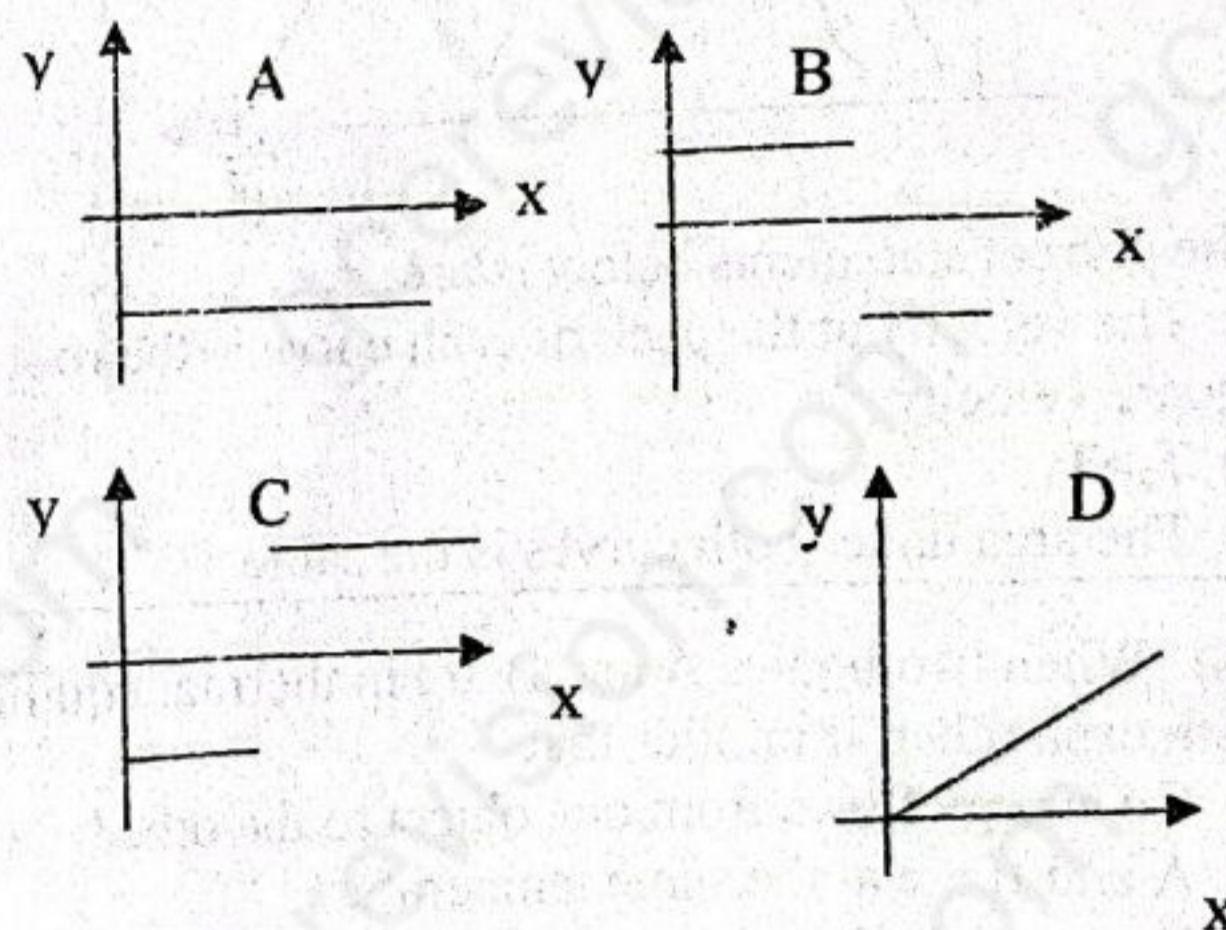


Figure 13

STOP.

NOW GO BACK AND CHECK YOUR WORK