SECTION A (50 Marks)

*Compulsory: Attempt **all** questions.*

Question 1

(a) ***Directions: For each question, there are four alternatives A, B, C and D. Choose the correct alternative and circle it. Do not circle more than ONE alternative. If there are more than one circled, NO score will be awarded.*** **[25]**

i. A paraglider experiences an upward force or thrust called

A contact force.
B drag force.
C frictional force.
D gravitational force.

ii. S.I. unit of density is

A kg/m^3.
B g/m^3.
C kg/cm^3.
D g/cm^3.

iii. Work done depends on the following factors EXCEPT

A magnitude of the applied force.
B displacement of the body.
C angle between the force and the displacement.
D position of the applied force.

iv. Copper offers less resistance to the flow of current due to

A less free electrons.
B more number of protons.
C more free electrons.
D more number of bound electrons.

v. The remote control of a television can switch channels with the help of

A radio waves.
B micro waves.
C infrared rays.
D ultraviolet rays.

vi. Which of the following relations between the force of gravity and the distance is correct?

A Force of gravity decreases with decrease in distance.
B Force of gravity increases with increase in distance.
C Force of gravity remains same with increase in distance.
D Force of gravity decreases with increase in distance.

vii. Force is a vector quantity because it has

A both magnitude and direction.
B only magnitude.
C only direction.
D no magnitude and direction.

viii. When submarine dives under water it experiences

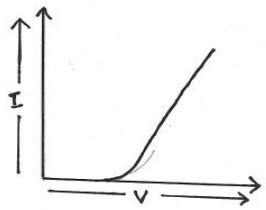
A more pressure.
B less pressure.
C constant pressure.
D no pressure at all.

ix. "Work done by a practical machine is always less than the work done on it"
Which of the following supports this statement?

A Weight and temperature of machine.
B Friction and weight of machine.
C Speed and friction of machine.
D Weight and speed of machine.

x. Which of the following graph best describes the Ohmic-conductor?

A



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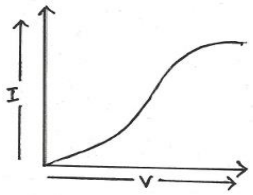

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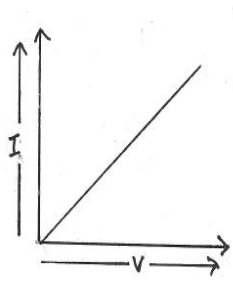

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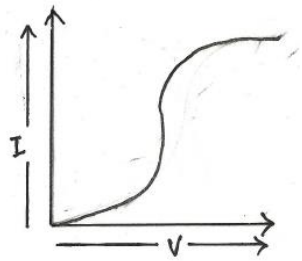


xi. The frequency of visible light is from

A 3×10^{6} Hz to 3×10^{13} Hz.

B 3×10^{4} Hz to 3×10^{13} Hz.

C 3×10^{13} Hz to 4×10^{14} Hz.

D 4×10^{14} Hz to 8×10^{14} Hz.

xii. In cosmological redshift an object

A moves away from us.

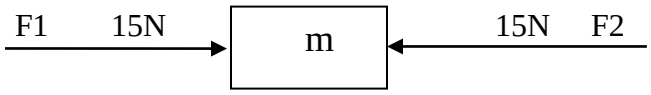
B moves closer to us.

C moves up and down.

D stays right in the middle.

xiii. The following two forces act on a block of mass 'm'. Which arrangement gives the block the greatest resultant force?

A



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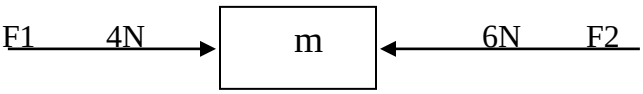

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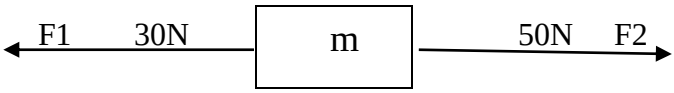

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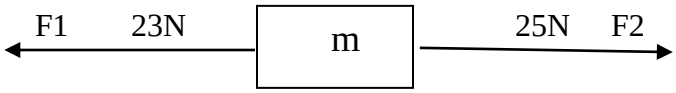
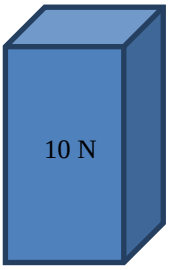


xiv. Which solid cube I, II, III and IV will exert a minimum pressure?

A



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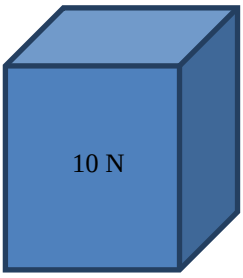

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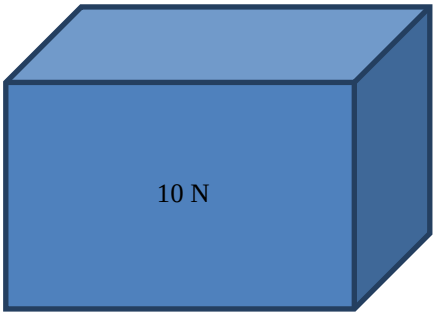

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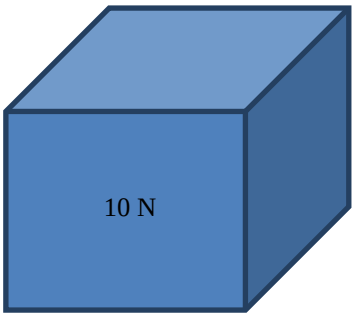
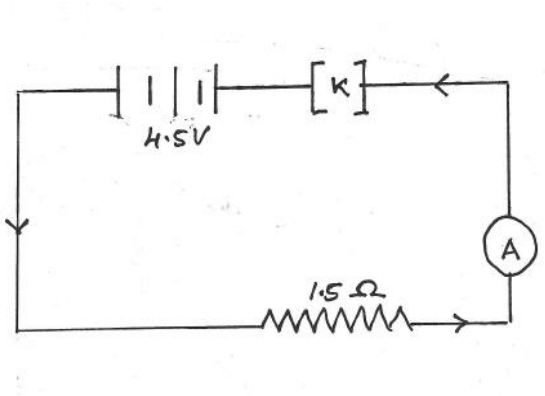


xv. Which of the following combination shows efficient ways to use energy?

I Energy-saving appliances
II Insulation
III Hydro-electricity
IV Technology

A I, II and III
B I, II and IV
C I, III and IV
D II, III and IV

xvi. What will be the ammeter reading in the circuit diagram given below?



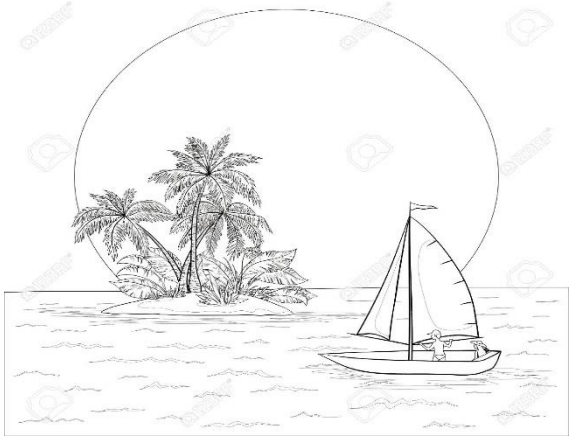
A 3A.
B 0·33A.
C 6·75A.
D 4·5A.

xvii. A teacher is able to hear another teacher teaching in the adjacent room due to
A diffraction of sound waves.
B reflection of sound waves.
C refraction of sound waves.
D transmission of sound waves.

xviii. Which of the following pairs is **CORRECT** about the habitable planet?

A	high temperature	low gravity
B	low temperature	low gravity
C	low gravity	small moon
D	stable temperature	solid surface

xix. Study the diagram given below.



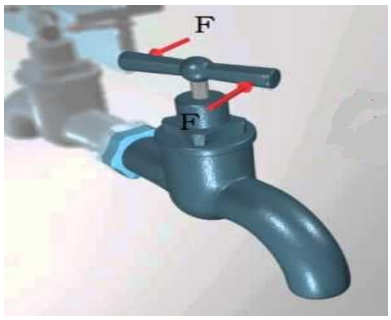
Why is the apparent weight of the boat appears to be zero?

A Actual weight of body is more than upthrust.
B Actual weight of body is less than upthrust.
C Actual weight of body is equal to upthrust.
D Apparent weight of body is equal to upthrust.

xx. If the primary coil in a step-up transformer is thin, it will not be able to

A withstand heavy current.
B multiply the current.
C form eddy current.
D stop the flow of current.

xxi.



This is an example of

A torque.
B couple.
C momentum.
D moment of force.

xxii. What is the harmful effect of using a petrol car?

A High maintenance cost.
B Air pollution.
C More noise.
D Expensive.

xxiii.

Such tubes re-emit visible light using

A x-rays.
B gamma rays.
C infrared rays.
D ultraviolet rays.

xxiv. Matter, energy, space and time were created during the

A Big bang.
B Planetary formation.
C Solar system.
D Galaxy formation.

xxv. The convectional direction of flow of current is

A in the direction of electrons.
B from low potential to high potential.
C in the direction of positive charge.
D along the direction of any charges.

b. **Match each item under Column A with the most appropriate item in Column B. Re-write the correct matching pairs in the answer sheet provided.** **[5]**

Column A	Column B
1. Moment of force	a. $\theta = 0^0$
2. Maximum work done	b. star system
3. Voltage drop	c. $\theta = 90^0$
4. Control air traffic	d. ma
5. Unit of universe	e. RADAR
	f. F × d
	g. galaxy
	h. resistance

c. **Fill in the blanks by writing suitable words.** **[5]**

i. The falling object accelerates downward at the start due to its

_____

ii. The trust per unit area is _____

iii. _____ energy is power derived from the earth's own internal heat.

iv. Electronic device which allows electric current to flow only in one direction is

_____

v. Supernova is a catastrophic explosion in which most of its mass is ejected by a

_____

d. R**e-write and correct the following statements by changing only the underlined word(s).** **[5]**

i. Passengers standing in a moving bus tend to be unstable due to <u>lowered</u> centre of gravity.
ii. When you lift a book from the table, the work done is <u>towards</u> gravity.
iii. Most electrical appliances use wire having <u>low</u> melting point.
iv. <u>Digital</u> signals are used by radio for the broadcasting services.
v. All object would fly off the earth without the force of <u>friction</u>.

e. **Answer the following questions:**

i. Define the gravitational field of the body? **[1]**

ii. Write the S.I. unit of pressure. **[1]**

iii. A hiker of mass 100 kg climbs to a height of 150 m above the ground level. Calculate his potential energy. [g = 10 m/s^2] **[2]**

iv. What do you understand by oscillating universe theory? **[1]**

v. State the **two** functions of a machine. **[1]**

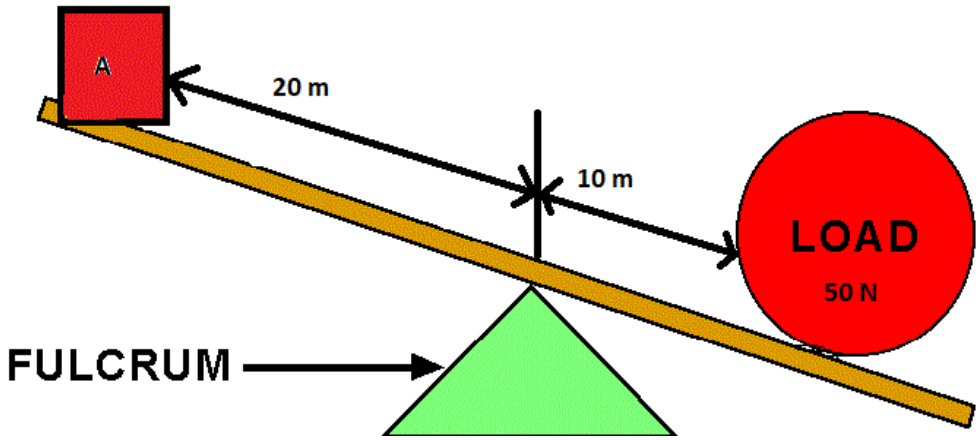
vi. Explain how the change in speed of rotation of the armature coil of a.c generator affects the production of electricity? **[2]**

vii. Developments in exploration of evidences of life elsewhere in the universe, NASA's James Webb Space Telescope [JWST] is scheduled to launch in 2018. What do you think this launch is going to explore? **[2]**

SECTION: B
Attempt ANY FIVE questions. [50 marks]

Question 2.

a) What weight should be placed at point A in order to balance the see-saw. **[2]**



b) Electricity can be generated by using resources like water and fossil fuel.
Which resource would you prefer to use in generating electricity? Justify your answer. **[2]**

c) Study the following figure of watering can and answer questions i. and ii. **[2]**

i. Give a reason why water spurt out from the hose or rose as in the figure.

ii. Name the law applied in answering (i).

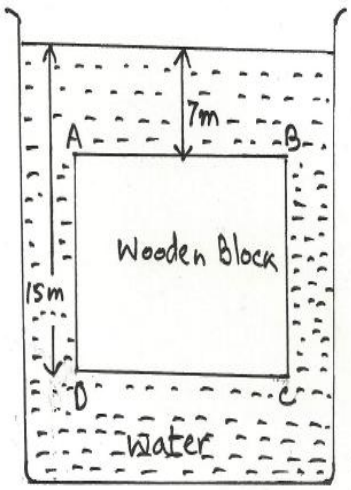
d) i. When was cosmic microwave background (CMB) formed? **[1]**

ii. What is the unit of Galaxy? **[1]**

e) What is twin pillars of sustainable energy policy? **[2]**

Question 3.

a) What will be the pressure difference on surface AB and DC of wooden block submerged in water? [g = $10m/s^2$] **[2]**



b) Write **two** ways to change the magnetic field lines passing through a circuit. **[2]**

c) Why are the handles on doors located at the end? **[2]**

d) i. Define resistance. **[1]**

ii. State **two** factors on which resistance of the conductor depends. **[2]**

e) State law of conservation of energy. **[1]**

Question 4.

a) Write down the sources for the following list of energies. **[2]**

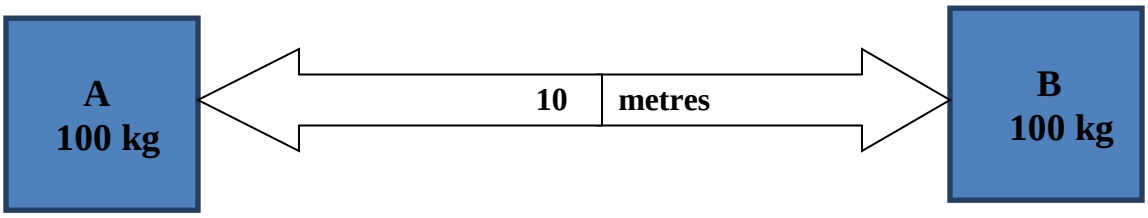
1. Solar energy	
2. Bio energy	
3. Geothermal energy	
4. Hydro electricity	

b) What **two** factors affect the magnitude of pressure due to solid? **[2]**

c) What will happen to people involved in handling Gamma rays if they are not provided with lead coated apron and equipment without safety measures? **[2]**

d) How can the energy efficiency of a vehicle be improved? **[2]**

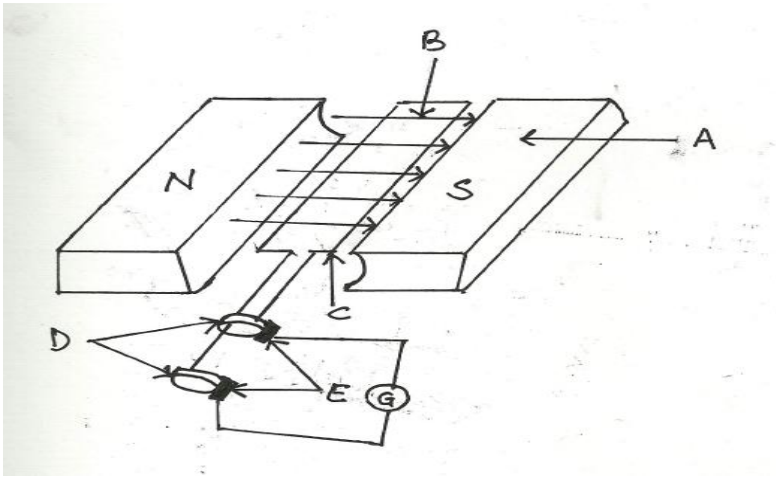
e) The mass of body A and B are given as in the figure below:



What would be the gravitational force between A and B if the mass of body 'A' and 'B' are doubled, keeping the distance same? **[2]**

Question 5.

a) i. Label the parts marked A, B, C, D and E in the figure given below. **[2½]**



ii. Name this device. **[½]**

b) What do you understand by the term work? **[1]**

c) What relation can you draw between nebula and the formation of solar system? Explain. **[2]**

d) Write **two** conditions for a body to be in equilibrium. **[2]**

e)

Sl.No.	Resistance	Current I	V
1	5Ω	10A	50V
2	5Ω	20A	100V
3	5Ω	30A	150V
4	5Ω	40A	200V

i. What is your observation of the value 'V'? **[1]**

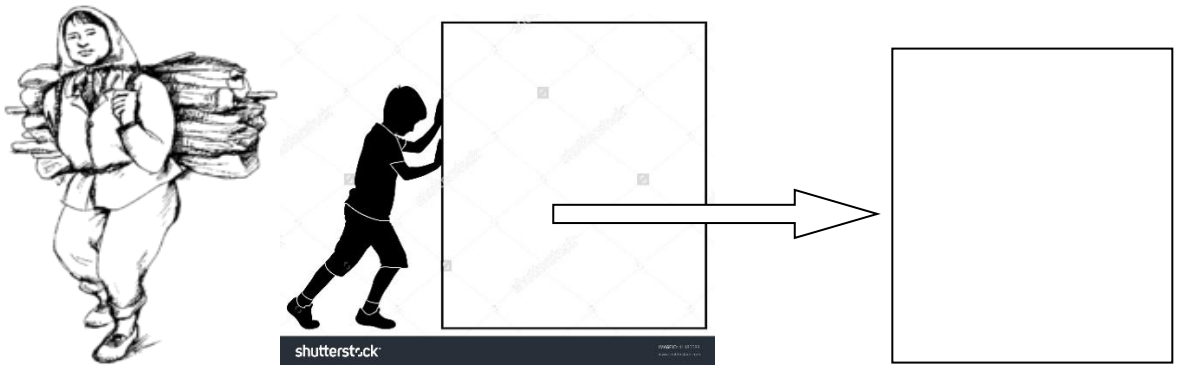
ii. Give reason for the observation that you have made. **[1]**

Question 6.

a) Khasadrapchu sub station transformer lowers e.m.f from 220V to 24V. If the number of turns in primary coil are 4400, how many turns are there in secondary coil? **[2]**

b) Write **two** characteristics of free falling objects. **[2]**

c) A labor is standing with 50 kg sack on his back while Dorji is pushing a wooden box as shown in the diagram below:



Labor Dorji Position A Position B

i. Who is actually working in the above figure? **[2]**

d) i. What fact would you use to explain the reason for not hearing an echo of a teacher teaching in the class? **[1]**

ii. Give an example of a situation where echo can be heard clearly. **[1]**

e) State the law of universal gravitation. **[2]**

Question 7.

a) Calculate the acceleration due to gravity of earth whose mass is m_e = 5·98 × 10^{22} kg, and radius r = 6·38 × 10^{6} m. [G = 6·67 × $10^{-11} Nm^2 kg^{-2}$] **[2]**

b) What would result if a cylindrical juice glass is first filled and then emptied? **[2]**

c) Write short notes on the following: **[2]**

1. Bluetooth

2. Wi-Fi

d) Can you distinguish between the pressure due to solid and pressure due to fluid. **[2]**

e) Why do you think optical fiber is a better medium for the transmission of information than copper cables? **[2]**

for Rough Work

for Rough Work

for Rough Work