GSA - 2024 (Past Papers)

OB-54

Self-mock exam - Ammar Yasir Date 9/12/24

Part-I (MCQs)

Q1

1- C
2- B
3- D
4- A
5- C
6- B
7- D
8- B
9- C
10 - C
11- B
12 - A
13 - C
14- D
15 - D
16 - C
17- C
18- C
19- C
20- A

Q4

a) Carbohydrates and Vitamins are essential nutrients required by a living body. Carbohydrates are a source of energy in general. Whereas, Vitamins in various forms, have a diverse range of bodily functions. Deficiency of these minerals leads to malnutrition, which could cause serious health problems.

Role of Carbohydrates in the body

Provides energy to the body:

Carbohydrates are essential source of energy for the body. It contains 0.4g/unit of energy. The body requires it to function. Every organ system requires energy to function effectively. For example, muscles require energy in order to physically perform a task. Such energy is produced through aerobic respiration in cells in which Carbohydrates are broken down.

Stored as Glycogen

Carbohydrates, when digested, is broken down for intestinal absorption. After being utilised, the unused molecules are converted into Glycogen by Insulin in the liver. It is converted back to simpler forms for bodily function when required. Hence, it acts as a storage/inventory.

Helps improve digestion

Carbohydrates in complex form of fibre cellulose is a fibrous material. It in undigestable but helps in digestion process by avoiding issues like constipation.

Role of Vitamins in the body

Vitamin A : They are also known as retenoids which aids in providing healthy vision and prevents nightsblindness.

Vitamin B1 : They are known as Thyamine which improve nerve functions of the body

Vitamin B3 : They are known as Niachin which helps in metabolism and acts as antioxidant.

Vitamin B7 : They are also known as Biotin which aids in growth of nail and hair.

Vitamin D : They are also known as Calcicalcipheval Ascorbic acid which regulates Calcium in bones.

Vitamin E : They are important antioxidants that reduce the aging process.

Vitamin K : They are essential for immune system, clotting and production of RBCs

b) Liver and Pancreas are essential parts of body. They are situated close to each other with various essential functions. such as blood cleaning and secretion of enzymes for digestive system.

Functions of Liver

Filters the blood from unecessary components:
Liver, like kidney, helps in filtering blood from waste and excess. For example, it removes the dead RBCs by breaking them down. It provides a yellowish colour which the bile secrete during digestion to be excreted lateronwards.

Stores glucose:
Liver secretes Insulin, a hormone, that interacts with glucose and converts it into Glycogen. Hence, Glycogen is stored in liver. When the body needs Glucose, the liver convert Glycogen back in usable form used for cellular activities

Function of Pancreas

Secretes enzymes during digestion:
During the process of digestion, Pancreas secretes essential enzymes to break down complex food molecules into simpler forms to be absorbed into the body. Pancreatic Amylase breaks which into simpler units while Pancreatic lipase helps in breaking Tri-Glycerides.

Discuss these in more detail

Drinking water is essential for human body. With over 70% of body's composition in the form of water, the water standards must be strictly implemented. A water should be neither too alkaline nor too acidic as it would provide complications in processes like digestion or result in heart burn.

Moreover, it should have all the essential minerals needed by the body in optimum amount. Excess of minerals like Zinc would provide body with various issues. A small quanlity of Zinc is essential for nerve functions.

Drinking water must be boiled and cooled down before drinking to kill harmful microorganisms. People on could get infected with diseases like Cholera and Diarrhea if the water is not boiled properly.

Drinking water should be inspected by health inspectors to determine the quality of water and rate its results on the healthy benchmarks.

Heavy metals in Water

Heavy metals in water, such as a sinking or sinked ship, catches rust in water which produces such. As mentioned previously of living body needs a small amount of Zinc. Excess could prove fatal to the body. Some chemicals from metal deplete Oxygen that reduce Oxygen availibility

for living organisms under water.

d) **Definition of Radioactivity**

Radioactivity is the emission of radiation when the process of fission and/or fusion occurs. The radioactive waste will emit radiation until it attains the point of stability

Laws of Radioactivity

Radioactivity, in unstable form, tends to regain its stability overtime as it emits radiation. They are produced in the form of Beta, Gamma and Alpha radiation. Alpha radiation can be easily stopped but it has can travel large distance. Beta radiation albiet, is relatively difficult to stop and travels lesser than Alpha radiation. Gamma rays travel less but would need thick amount of lead to prevent its penetration

Radioactive elements include Uranium and Plutonium.

Date: _____

Q5
a) Plant are known as producers of food in the food chain. They require various nutrition elements essential to survive and grow.

Starch: Starch, a stored form of Carbohydrate, is used when plant requires glucose for cellular activities.

Cellulose: Cellulose is used to provide cell plant a 'skeletal' structure.

Fats: Fat are used in the production of cell membrane

Protien: Protiens are used in DNA synthesis and protien formation for various functions

Water: Plant cells contain Chlorophyll that use sunlight to break Hydrogen molecule from Oxygen molecule. It creates energy used in various cellular activities.

Q6-
b)

Difference between Software and hardware

Software	Hardware
1- Does not have Physical properties	1- Have physical properties
2- Are in the forms	2- Are in the form of

b)

Software	Hardware
Apps, Web browsers and Operating System	hard elements that can be touched as well.
3- Operates through coding system	3- Operate through their physical properties
Examples	Examples
1- Google Chrome	1- Mouse
2- Facebook	2- Keyboard
3- Microsoft Word	3- Motherboard
4- Slack	4- SSD
5 Zoom	5- HDD

c) Earthquake is the process of shaking involving lithosphere as a result of movement of techtonic plates. Energy is released due to stress causes the earth to shake. There are various types of earthquakes.

The first type of waves are its movement up and down as shown in the figure.
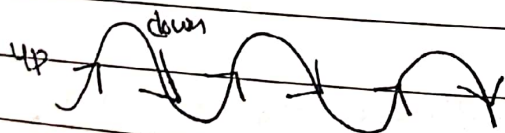
The lithosphere jolts up and down as a result of friction between the techtonic plates. It originates from hypocenter and spread in all directions. As the distance increases, the movement of shaking up and down subsides.

left

·Right

The next type is its movement side waves from its epicentre. The movement of the tectonic plate is right and left before it subside with distance.
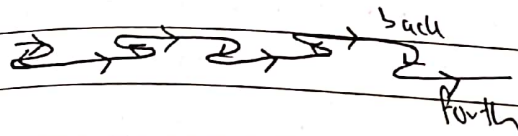
back

forth

The third type is its movement back and forth. The tectonic plates provides forward and subsequent shocks h a specific place. This could be fatal and could result in loss of life and infrastructure.

d) longitudinal waves

4p   down
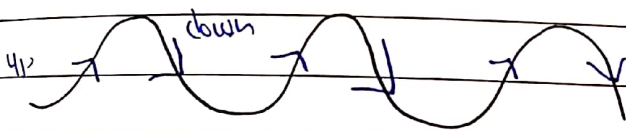
Longitudinal waves are movement of in the form of waves that rise and fall. It varies in frequency and wavelength. An example of longitudinal waves are infrared waves.

Electromagnetic waves radiation
Electromagnetic radiations are longitudinal waves formed through movement of radiation emitted from radiating body. It contain various

types of radiation with varying frequency and wavelength such as ultraviolet radiation, radio waves and microwaves.

Gamma radiation

Gamma radiation are emitted from radioactive substances. It has high penetrating properties that could penetrate human skin and increase chances of cancer and mutation. However, it travels at lesser distance. A thick lead would be able to stop it from penetrating.
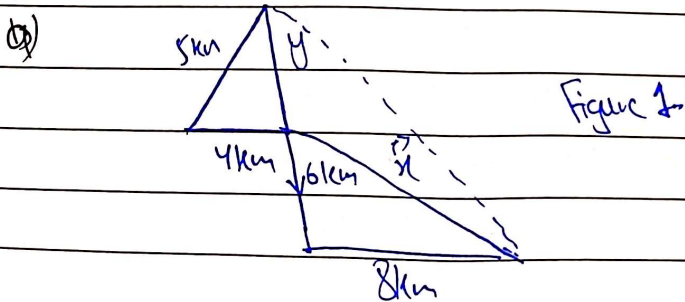
Section- B

Q(6)

a)
$$a + b + c + d = 108$$
$$a + b = 12 \quad b = 3/4 \times b \quad 3/4 = \frac{4}{4}d$$
$$a = 25$$

Q7

b)

Figure 1

5km, y, 4km, √61km, x, 8km

Phythagoras Theorem — (1)

Hypotneuse = Base + Height
$$5^2 = 4^2 + y^2$$
$$25 - 16 = y^2$$
$$9 = y^2 \quad \sqrt{y^2} = \sqrt{3^2} \quad \boxed{y = 3}$$

Pythagoras Theorem (2)

$$Height = y + 6$$
$$= 3 + 6$$
$$= 9$$

$$x^2 = 9^2 + 8^2$$
$$= 81 + 64$$
$$x^2 = 145$$
$$x = 12.04 \, km$$

Total distance Covered $= 3 + 6 + 8$
$$= 17 \, km$$

Distance from Starting point $= 12.04 \, km$

Hence, the man initially took 3 km until he
went further six kilometers, and then he took
90° turn and travelled 8 km. Hereafter
This makes his total distance travelled as
17 km. Through Figure 1, we were able to
calculate and visualise the base and
height from his initial point. Phythagorus Theorem
was applied to calculate his distance
from initial point which is 12.04 km.

) let H be Husan $H = \frac{1}{3}(AL) - (1)$
" Al be Ali
" AK be Akbar $AL = 5 AK \quad -(2)$
" N be Nasir $AK = 3 N \quad -(3)$
" S be Shahbaz $S = N - (4)$ Total $= 8000$

$$\therefore H + AL + AK + N + S = 8000$$

* Substituting Multiple formulas of one to fix of H

$$H = \frac{1}{3}(5(3N))$$

Making S the variable in each formula

$H = \frac{1}{3}(S)(3S)$

$Al = S(3S)$

$Ah = 3S$

$N = S$

$\frac{1}{3} \times S \times 3S + S(3S) + 3S + S = 8000$

$SS + 15S + 3S + S = 8000$

$24S = 8000$

$S = \cancel{8000}^{\,2000} \big/ \cancel{24}^{3} \;\; 1000$

$S = 333.3 \ Rs$
$N = 333.3 \ Rs$
$Ah = 1000 \ Rs$
$Al = 5000 \ Rs$
$H = 1666.6 \ Rs$

$Ah = \dfrac{1000 \times 3}{3}$

$Al = 1000 \times 5$

$H = \dfrac{5000}{3}$

c) Volume of Sphere $= \frac{4}{3}\pi r^3 = \frac{4}{3} \times \frac{22}{7} \times \cancel{7} \times 7 \times 7 = 821.9 \ m^2$

S.A of Sphere $= 4\pi r^2 = 4 \times \frac{22}{\cancel{7}} \times \cancel{7} \times 7 = 616 \ m$

d) Zain : Aslam : Ashraf

$\quad\;\; 2 : 3 : 7$

Ratio method

$$\frac{\text{Portion of } n}{\text{Total portion}} \times \text{Total amount} = \text{Amount distributed to } n$$

$$\text{Zain's amount} = \frac{2}{12} \times \overset{360}{\underset{\overset{2160}{4320}}{4320}} \boxed{= 720 \text{ Rs}}$$

$$\text{Aslam's Amount} = \frac{3}{12} \times \overset{360}{4320} \boxed{= 1080 \text{ Rs}}$$

$$\text{Ashraf's Amount} = \frac{7}{12} \times \overset{360}{4320} \boxed{= 2520 \text{ Rs}}$$

Q8-

a) $$\text{Profit} = \frac{1}{4} \times 100$$

$$= 25\%$$

Selling Price = 2400,000 Rs

Selling Price % = 100 + 25
   = 125%

Ratio Method

	Selling Price	Profit
%	125	25
(RS) amount	2400000	n

$$125n = 2400000 \times 25$$

$$n = \frac{2400000 \times 25}{125} \overset{480000}{\underset{5}{}} \qquad n = 480000 \text{ (Profit)}$$

$$\text{Cost} = \text{Selling Price} - \text{Profit}$$

$$= 2400000 - 480000$$

$$= 1920000 \text{ (Cost)}$$

b) 12 men

Men	: Days	: Job
	24	: 1
12		
8	: 2d

4 day 4 pers

$$\text{Men/day} = \frac{12}{24}$$

$$\text{Job done for } = \frac{12^1 \times 4^2}{24 \, 2 \, 1}$$
4 days

$$4 \text{ day of work} = 1 \times 4 \times 21$$
$$\frac{}{24}$$
$$\frac{12-6}{}$$
$$= \frac{1}{6} \text{ done}$$

Remaining $\frac{5}{6}$

$$\frac{5}{6} = 1 \times x \times \frac{8}{21}$$
$$\frac{5}{6} \quad x$$

$$5n = 48$$
$$n = \frac{48}{5} \qquad \boxed{= 9.6 \text{ days}}$$

c) Tree

10m ---- 10m

20m

d)

60km/h →A   C
←100km/h B   ↓80km/h

B ←2r 40km→ A
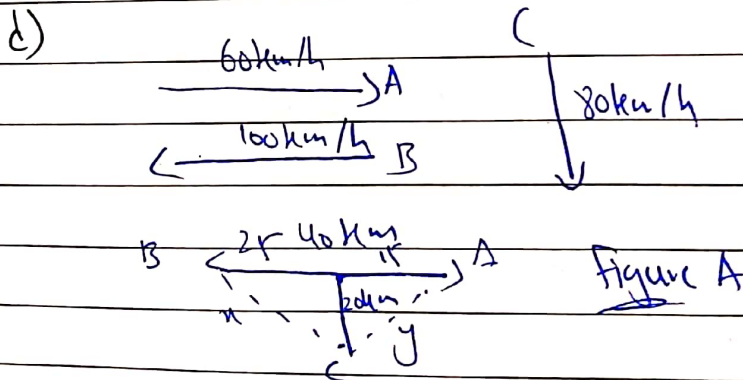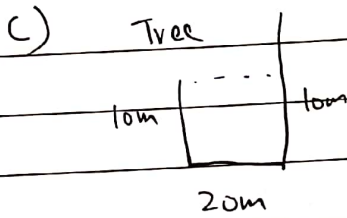
Figure A

i) Distance between A and B
$$= DA + DB$$
$$= T_A S_A + S_B T_B \qquad \leftarrow Speed = \dfrac{Distance}{Time}$$

$$= \dfrac{15}{60} \times 66 + \dfrac{15^5}{31.60} \times 60$$

$$= 15 + 25$$

$$\boxed{= 40 \, km}$$

Distance of C from starting point
$$= S_C \times t_C$$
$$= \dfrac{48}{60} \times 15 = 20 \, km$$
$$\dfrac{60}{31}$$

) Using Pythagorus Theorem as in figure A

$$Hy^2 = B^2 + H^2$$
$$Hy^2 = 20^2 + 20^2$$
$$= 400 + 400$$
$$= 800.$$

Distance from
b/w C and B =

) $Hy^2 = B^2 + H^2$ (B and C)(ii)
$$= 15^2 + 20^2$$
$$= 225 + 400$$
$$= 625$$
$$\boxed{= 25 \, km}$$

$Hy^2 = B^2 + H^2$ (A and C)
$$= 25^2 + 20^2$$
$$= 625 + 400$$
$$= 1025$$
$$\boxed{= \sqrt{1025} \, km}$$