

DATE: 3-02-26

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Batch 83 (4/203)

Mock Exam III

General Science and
Ability

X=====X
(Section A)

Q NO. 2

a. Describe the structure
of universe according
to big bang Theory

Definition:

The Big Bang
Theory states that the
universe originated from

a single, extremely hot and dense point (singularity) about 13.8 billion years ago and has been expanding ever since.

Structure

Singularity:

All matter and energy concentrated in one point.

Explosion and Expansion:

Sudden expansion sent matter outward.

Formation of Particles:

Quarks $\rightarrow$ protons and neutrons $\rightarrow$ atoms.

Formation of Cosmic Structures:

Atoms formed stars, galaxies, and clusters.

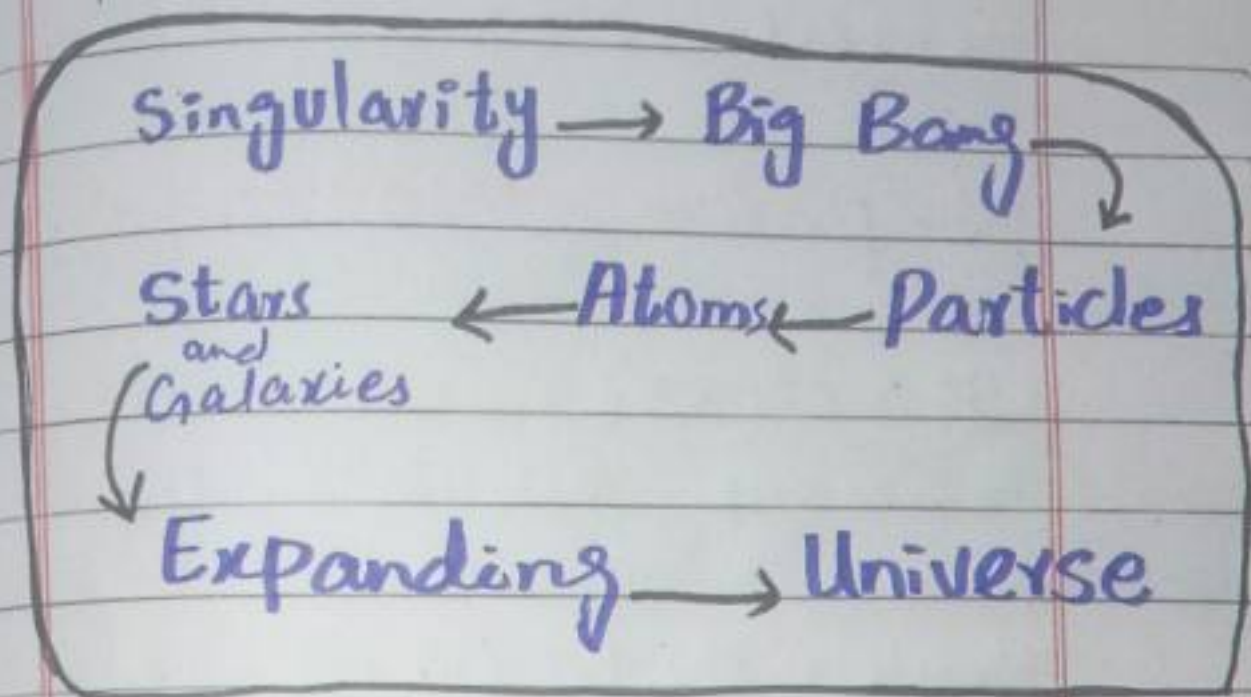
Present Universe:

Continues to expand

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with galaxies moving apart.



flow chart diagram



b Define Urinary System and explain the working of nephron.

Definition

The Urinary System removes metabolic waste and maintains

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water-salt balance,
consisting of kidneys,
ureters, bladder urethra.

Nephron - Working:

Structure:

Bowman's capsule + Glomerulus
Proximal tubule + Loop of
Henle + Distal tubule + Collecting duct

Filtration

Blood filtered in glomerulus,
water, salts, glucose, Urea →
Bowman's capsule.

Reabsorption

Useful substances reabsorbed
into blood.

Secretion and Excretion:

waste secreted into
tubules → Urine collected →
Bladder → Urethra.

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Afferent
arterioleEfferent
arterioleBowman's
capsule

Glomerulus

NaCl H₂O

Cortex

outer medulla

Inner
medullaH₂OH₂O

NaCl

H₂O

Urea

H₂O

Nephron



c What is Un-balanced diet? How it affects the healthy living?

Definition:

An un-balanced diet either lacks essential nutrients (proteins, vitamins, minerals) or has excessive components (sugars, fats).

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Effects on Health:

Deficiency Diseases:

e.g. Rickets (vit D)
Scurvy (vit C).

Obesity and Heart Diseases

Excess fats and
sugar.

Weak Immunity

poor resistance to
infections.

Delayed Growth

Especially in children, affects
mental and physical development

Chronic Conditions:

Diabetes, hypertension
due to poor diet.

Unbalanced Diet

Nutrient → Deficiency →
Diseases & Health issues

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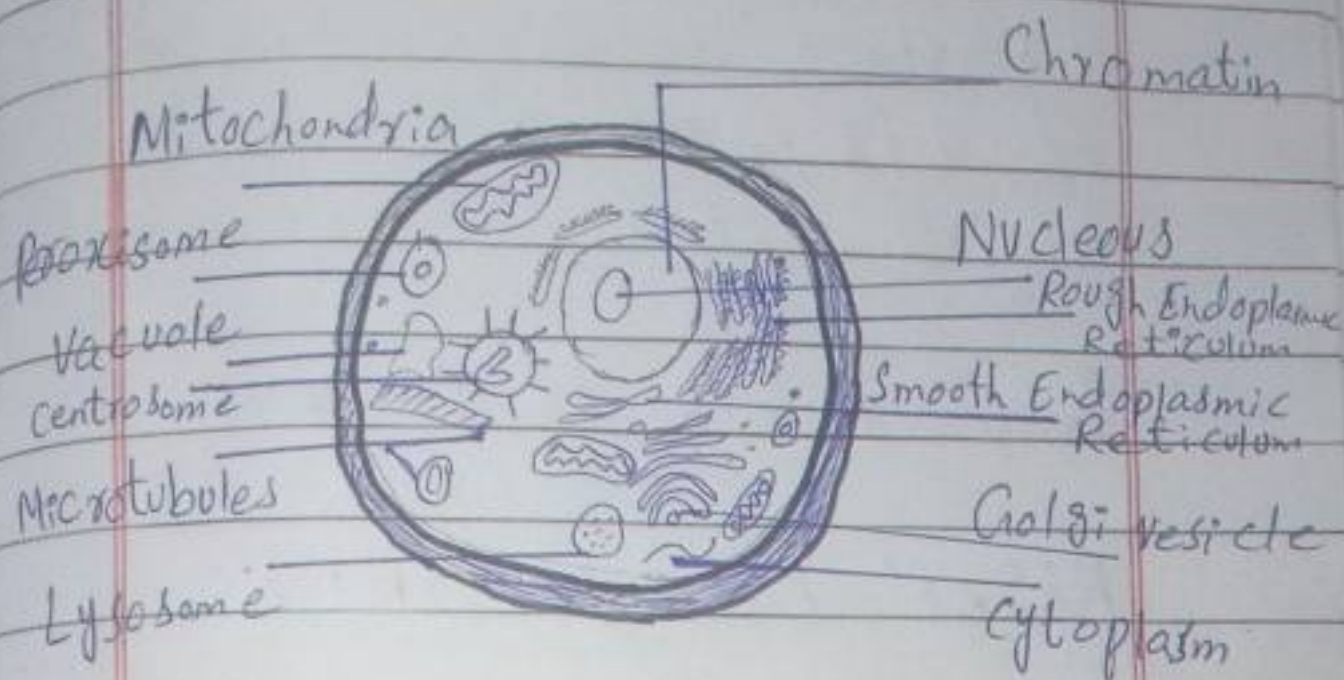
d Describe the Structure and functions of cell membrane, cytoplasm and mitochondria?

Answer:

Components	Structure	Function
Cell wall	Rigid layer outside plant cells (cellulose)	Provides support, shape and protection
Cell Membrane	Thin flexible lipid bilayer around cell.	Controls movement of substances in and out.
Cytoplasm	Jelly like substance with organelles	Site of some and supports organelles
Mitochondria	Double-membrane organelle with cristae	Produces ATP via cellular respiration

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Animal Cell Structure with Cell (plasma) Membrane

Q No. 5

a What is DRM?
Importance and Risks?

Definition:

Disaster Risk
Management (DRM) is the
process of identifying, assessing,

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and reducing the risks of disasters to minimize loss of life, property and environmental damage.

Importance of Risk

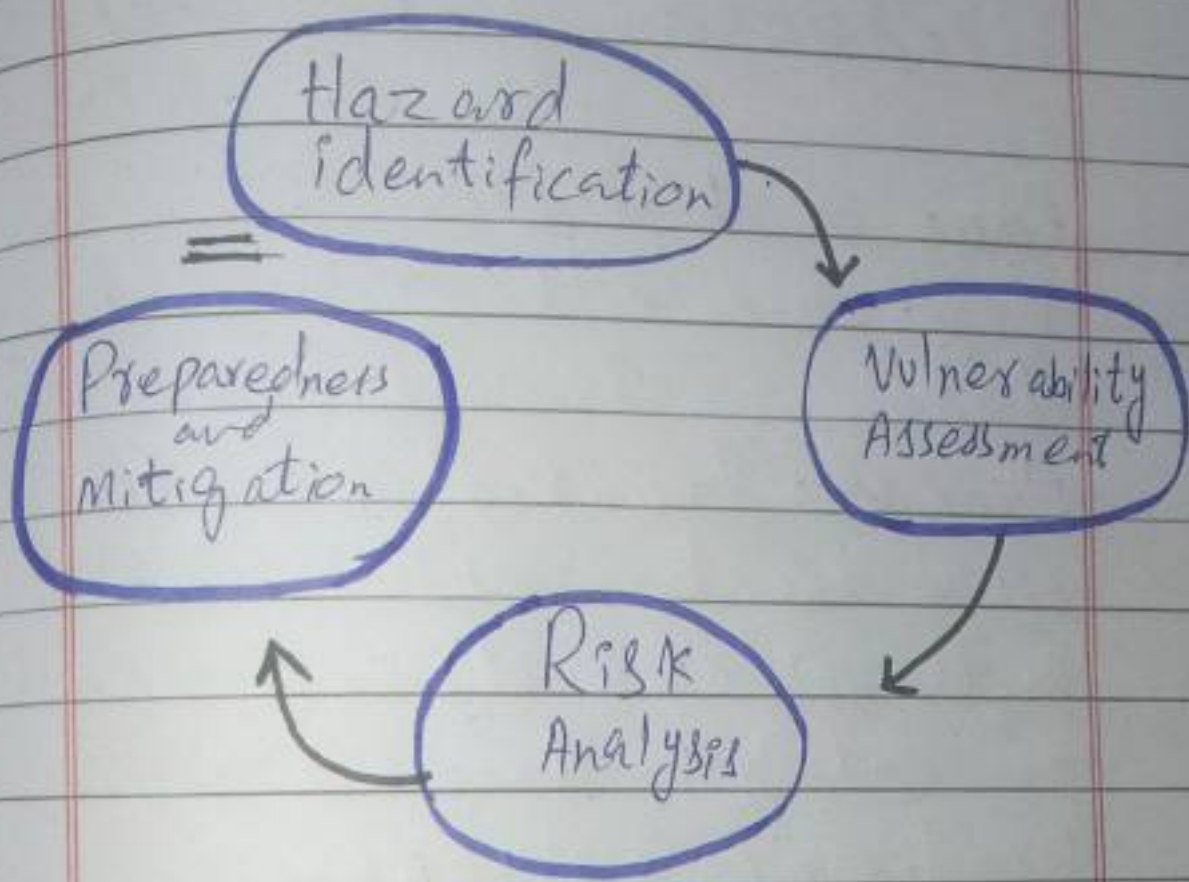
Assessment in DRM:

- 1 **Identifies hazards:** Natural (earthquake), flood, and man-made (industrial accidents).
- 2 **Evaluates Vulnerability**
Determines which communities or areas are most at risk.
- 3 **Prioritizes resources**
Helps allocate, funds, equipment, and personnel effectively.
- 4 **Prepares response strategies:**
Enables early warning systems

and evacuation plans.

5 Reduces potential losses:

By taking preventive measures, damages can be minimized.



b Biofuels - Biodiesel and Biogas

Definition:

Biofuels are

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renewable fuels derived from biological materials such as plants, algae, or animal waste.

Production of Biofuels:

Raw materials

Vegetable oils or animals fats.

Process: Transesterification — oils react with alcohol (methanol/ethanol) in presence of catalyst to produce biodiesel + glycerol.
use:

Can be used as a diesel **Substitute** in engines.

Production of Biogas:

Raw materials: Organic waste

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(kitchen waste, cow dung).

Process:

A anaerobic digestion in a biogas digester, producing methane (CH_4), CO_2 , and trace gases.

Use:

Fuel for cooking, heating, or electricity generation.

Vegetable oil + Alcohol +

Catalyst $\rightarrow$ Biodiesel +

Glycerin

Organic waste $\rightarrow$ Anaerobic

Digestion $\rightarrow$ Biogas ($\text{CH}_4 + \text{CO}_2$)

Biogas and Biodiesel

1 Digestive system & Stomach and small intestine?

Definition:

The digestive system is a group of organs that break down food, absorb nutrients, and eliminate waste.

Role of Stomach:

- 1 Mechanical digestion
Churning food into chyme.
- 2 Chemical digestion
Secretes HCl & pepsin to break proteins
- 3 Temporary Storage:
Holds food before release

to small intestine.

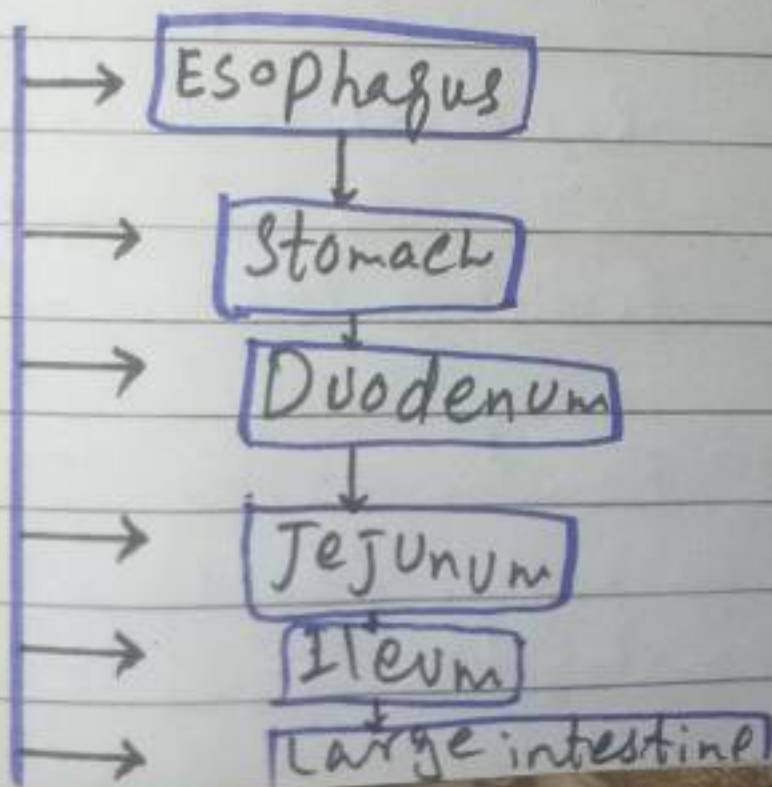
Role of small intestine:

Duodenum: Receives bile & pancreatic juice for digestion of fats, proteins, carbohydrates.

Ileum & Jejunum: Main site of nutrient absorption into blood/lymph.

Villi & microvilli: increase surface area for maximum absorption.

Diagram
Stomach + small intestine



d Plastic b → Properties, Application & Environmental Risks ?

Definition:

Plastics are synthetic polymers made from petroleum derivatives, widely used for their versatility and durability.

Properties:

- a Lightweight and strong.
- b Flexible or rigid.
- c Resistant to water, chemicals and corrosion.
- d Insulating (electrical & thermal).

Applications:

- a Packaging (bottles, bags)
- b Construction (pipes, insulation)

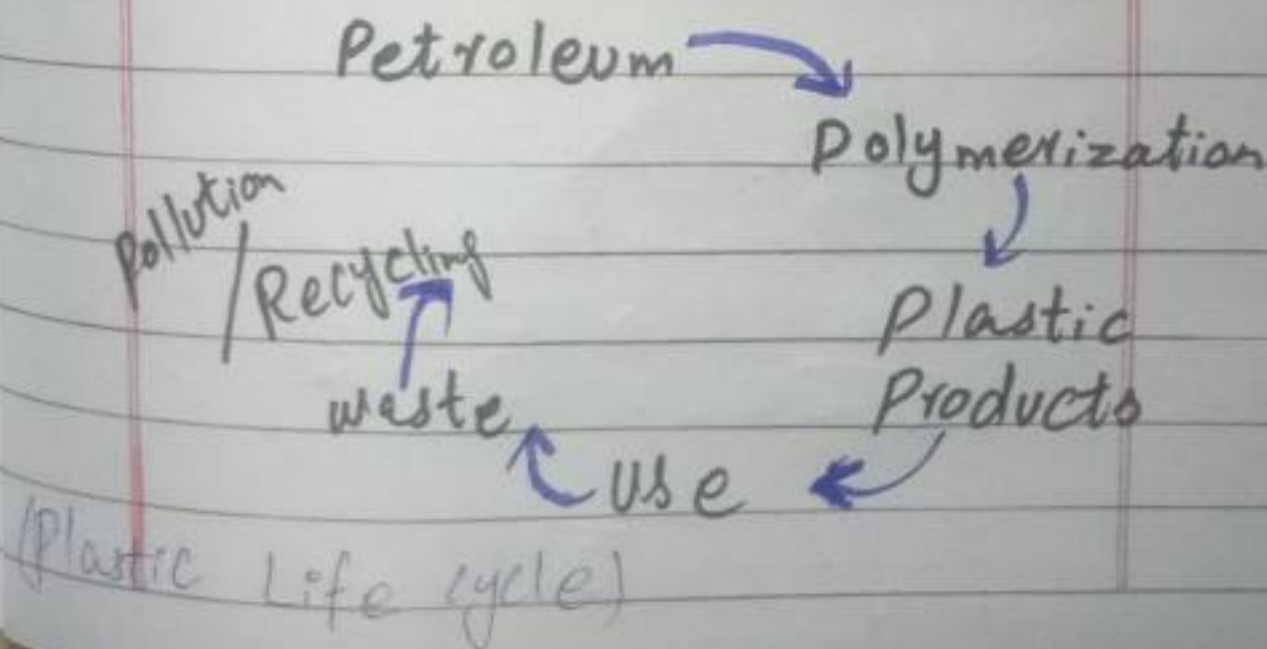
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- c Household items (utensils, furniture)
- d Electronics (casing, components)

Environmental Risks:

- 1 Non-biodegradable → accumulates in landfills & oceans.
- 2 Releases toxic chemicals when burned
- 3 Harm to wildlife through ingestion or entanglement
- 4 Microplastics contaminate soil and water



(Section B)

Q No. 7

(a) Ratio of two numbers

Given:

$$40\% \text{ of 1st number} = \frac{2}{3} \text{ of 2nd number}$$

Let first number = x

Second number = y

$$0.4x = \frac{2}{3}y$$

Solve for ratio $x:y$

$$\frac{x}{y} = \frac{2/3}{0.4}$$

$$\frac{2/3}{2/5} \Rightarrow \frac{2}{3} \times \frac{5}{2}$$
$$= \frac{5}{3}$$

Answer = $5:3$

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(b) Cost price of a ball

Given:

Selling 17 balls = RS. 720

Loss = cost price of 5 balls

Cost price of one ball = ?

Let's

Cost price of one ball = x

Total cost price of 17 balls = $17x$

Loss = $5 \times x = 5x$

Selling price formula

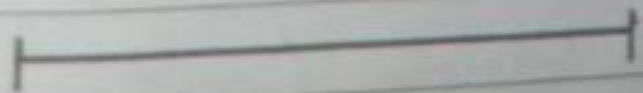
Selling price = Cost price - Loss

$$720 = 17x - 5x$$

$$720 = 12x$$

$$x = \frac{720}{12} = 60$$

Cost price of one ball = RS. 60



c

present age of son

Given

→ Father is 24 years
older than son

→ in 2 years: Father's age
= $2 \times$ son's age

Let's

Present age of son = x

Father's age = $x + 24$

After 2 years:

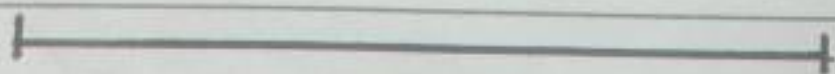
$$x + 24 + 2 = 2(x + 2)$$

$$x + 26 = 2x + 4$$

$$2x - x = 26 - 4$$

$$x = 22$$

present age of son = 22 years



d

Time taken by Rashid
and Ramran working together

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Given

Rashid : 32 pages in 6 hours

$$\frac{32}{6} = \frac{16}{3} \text{ pages/h}$$

Kamran : 40 pages in 5 hours

$$\frac{40}{5} = 8 \text{ pages/hr}$$

Total assignment = 110 pages

Combined work rate :

$$\frac{16}{3} + 8$$

$$\frac{16}{3} + \frac{24}{3} = \frac{40}{3} \text{ pages/hr}$$

Time to complete 110 pages
together

$$= \boxed{8 \text{ hours } 15 \text{ minutes}}$$



Q No. 8

a Houses Arrangement

Given:

A is to the right of B

→ B - A

E is to the left of C
and right of A

→ A - E - C

B is to the right of D

→ D - B

Now Arrange

From B - A and D - B → D - B - A

E is between A and C

→ A - E - C

Combine all

D - B - A - E - C

Now middle house

D, B, A, E, C

Middle house - A

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b Direction & Distance

Given movements:

Start $\rightarrow$ North $\rightarrow$ 4 km $\rightarrow$ turn left $\rightarrow$
 $\rightarrow$ 5 km $\rightarrow$ turn left $\rightarrow$ 5 km $\rightarrow$ turn left
 $\rightarrow$ 6 km $\rightarrow$ turn left $\rightarrow$ 1 km

Track position

- 1 Start $\rightarrow$ North 4 km $\rightarrow$ Current position 4 km of Start (2) Next Turn left $\rightarrow$ West 5 km $\rightarrow$ Now 4 km north, 5 km west
- 3 Turn left $\rightarrow$ **South** 5 km $\rightarrow$
now $(4 - 5) = -1$ km north
 $\rightarrow$ 1 km South, 5 km west.
- 4 Turn left $\rightarrow$ **East** 6 km $\rightarrow$ now 1 km South, $(5 - 6) = -1$ km east $\rightarrow$
1 km east, 1 km South
- 5 Turn left $\rightarrow$ North 1 km $\rightarrow$ now
0 km north-south, 1 km east.

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Distance from starting point

Coordinates: (East 1 Km, North 0 km)

$$\text{Distance} = \sqrt{(1^2 + 0^2)} = 1 \text{ Km}$$

Direction while finishing

Last movement = North, so
facing North.

Direction after 2nd turn

2nd turn $\rightarrow$ after West (first turn)
 $\rightarrow$ second left $\rightarrow$ South

Direction to return to start
From (1 Km east, 0 Km north)

Must run west



C Odd man out - Anagrams

Given

a **THRST** → Thirs → Thirst

b **AOTC** → Coat

c **EOUBSL** → LoBes / BbSole → Double

d **KTRIS** → Skirt

e **RETAENS** → Sweater

most are clothing items:

Coat, skirt, sweater

odd ones: Thirst → not clothing

Answer (a) Thirst



d How many triangles
in the figure?

outer (big) triangles = 8

inner (small) triangles = 8

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Center. complete triangles = 2

$$So = 8 + 8 + 2 = 18$$

Total = 18 Triangles

