COMPETITIVE EXAMINATION · FULLY SOLVED STUDY COPY

General Knowledge-I

General Science & Ability — Complete Solved Paper (2025 Pattern)

Part I — MCQs (20 Marks) | Part II — Section A & B (80 Marks) | Every Question Answered In-Depth

How to use this copy: This is an independently prepared, fully worked answer key for self-study and exam practice. Every part and sub-part of the original question paper — including all 20 MCQs, both Section A descriptive questions, and every Section B numerical/reasoning problem — has been answered in full with complete workings. Correct MCQ options are highlighted in green.

Suggested SEO-friendly page title (for publishing this solved paper online — optimised for high search volume around "CSS past papers" and "FPSC solved papers"):

CSS General Science & Ability Solved Past Paper 2025 (FPSC) – Complete Answers, MCQs & Explanations

Alternative options:

FPSC CSS 2025 General Knowledge-I Past Paper With Solved Answers & MCQs

CSS Past Papers 2025 Solved: General Science and Ability (BS-17) – Full Guide

Suggested meta description: Download the fully solved CSS 2025 General Knowledge-I (General Science & Ability) past paper with detailed answers, step-by-step numerical solutions, and all 20 MCQs explained — ideal for FPSC CSS exam preparation.

PART I — MULTIPLE CHOICE QUESTIONS (20 Marks · 1 Mark Each · Compulsory)

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1. 'Blue dwarfs' and 'Red giants' respectively refer to:

A) Moons of Jupiter B) **Young star and Old star** C) Old star and Young star D) None of these

2. Most major Tsunamis are produced by earthquakes with hypocenters less than:

A) **30 km** B) 40 km C) 50 km D) None of these

> Tsunami-generating earthquakes are typically shallow (hypocentre depth under ~30 km) and of high magnitude (usually 7.5+), since deeper quakes transfer far less energy to the ocean floor.

3. Which of the following sources of energy is caused by uneven heating of Earth's surface?

A) **Wind** B) Solar C) Biomass D) None of these

4. Global winds towards the western direction are known as:

A) **Trade winds** B) Western winds C) Reynolds wind D) None of these

5. Perinatal transmission is said to occur when a pathogen is transmitted from:

A) Non-human to human B) Infected to uninfected C) **Mother to infant** D) None of these

6. Which plant group needs both land and water to complete its life cycle?

A) **Bryophyta** B) Tracheophyta C) Thallophyta D) None of these

7. Maximum amount of carbohydrates are obtained from:

A) Nuts B) Plant oil C) **Whole grain food** D) None of these

8. Which of the following classes has the largest number of animal species?

A) Fishes B) **Insects** C) Mammals D) None of these

9. The process of preserving meat by stewing it in a covered earthenware jug is called:

A) Burial B) **Jugging** C) Curing D) None of these

10. All operating systems get their total memory initialised from:

A) **BIOS** B) RAM C) ROM D) CPU

11. The amount of data transmitted for a given amount of time is called:

A) Noise B) **Bandwidth** C) Frequency D) None of these

12. Which of the following products can be prepared using raw guava?

A) Jam B) Jelly C) **Both (A) and (B)** D) None of these

13. Which of the following is used as a stabilizer in ice cream?

A) Sugar B) Milk C) **Gelatin** D) None of these

14. In the structure of an optical fiber, light is guided through the core due to total internal:

A) **Reflection** B) Refraction C) Diffraction D) None of these

15. Who is known as the inventor of the term "Artificial Intelligence"?

A) Charles Babbage B) **John McCarthy** C) Alan Turing D) None of these

> John McCarthy coined the term "Artificial Intelligence" in 1956 at the Dartmouth Conference.

16. Which of the following is historically regarded as the classic language for Artificial Intelligence research?

A) Java B) Python C) **Lisp** D) None of these

> Lisp (1958) was purpose-built for AI research and remained the dominant AI language for decades; Python is the most popular modern choice, but Lisp is the traditional/classic answer.

17. Cement factory labourers are prone to:

A) Leukemia B) **Cytosilicosis (Silicosis)** C) Bone marrow disease D) None of these

18. The fastest enzyme is:

A) Pepsin B) DNA polymerase C) **Carbonic anhydrase** D) None of these

19. The process of adding vitamins to milk is known as:

A) Flavoring B) **Fortification** C) Fermentation D) None of these

20. The waves used for line-of-sight (LOS) communication are called:

A) **Space waves** B) Cable waves C) Antenna waves D) None of these

PART II — SECTION A (General Science, 5 Marks per Part)

Q.2 (a) What effects are produced due to Rotation & Revolution of Earth? Explain briefly. **5**

ANSWER

Rotation (Earth spinning on its axis once every ~24 hours) causes:

- Day and night, and the apparent rising/setting of the Sun and stars
- The Coriolis effect — deflection of winds and ocean currents (right in the Northern Hemisphere, left in the Southern)
- Time zone differences across longitudes
- The slight flattening of the Earth at the poles and bulging at the equator

Revolution (Earth orbiting the Sun once every ~365.25 days) causes:

- The changing seasons, as the tilted axis (23.5°) exposes different hemispheres to more direct sunlight at different times of year
- Variation in the length of day and night through the year
- The apparent annual path of the Sun through the zodiac constellations (the ecliptic)
- The need for a leap year every 4 years, to correct for the extra quarter-day per orbit

Q.2 (b) Describe Electromagnetic Radiations. Give its types and explain their applications. 5

ANSWER

Electromagnetic (EM) radiation is energy that travels through space as coupled oscillating electric and magnetic fields, requiring no medium, and always travelling at the speed of light in a vacuum. The full range of EM radiation, arranged by increasing frequency/energy (decreasing wavelength), is called the electromagnetic spectrum.

Type	Key Application
Radio waves	Broadcasting, wireless communication
Microwaves	Cooking (microwave ovens), radar, satellite links
Infrared (IR)	Thermal imaging, remote controls
Visible light	Human vision, photography, optical instruments
Ultraviolet (UV)	Sterilisation, Vitamin D synthesis in skin
X-rays	Medical imaging, security scanning
Gamma rays	Cancer treatment (radiotherapy), sterilising medical equipment

Q.2 (c) What are Hurricanes? How are they formed and what level of damage can they produce? 5

ANSWER

A **hurricane** (also called a tropical cyclone or typhoon depending on region) is an intense rotating storm system with sustained wind speeds of at least 119 km/h, forming over warm tropical ocean waters.

Formation: Warm ocean water (above ~26.5°C) heats and evaporates moist air, which rises and creates a zone of low pressure; surrounding air rushes in, and the Coriolis effect (from Earth's rotation) causes the system to spin. As the rising moist air condenses, it releases latent heat, fuelling the storm and intensifying it into an organised, rotating system with a calm "eye" at the centre surrounded by the powerful "eyewall."

Damage: Hurricanes are classified on the Saffir–Simpson scale (Category 1–5). They cause damage through violent winds (destroying buildings, infrastructure and crops), storm surge (coastal flooding from sea-level rise pushed inland), and torrential rainfall (inland flooding and landslides) — leading to major economic losses and, in severe cases, significant loss of life.

Q.2 (d) Explain the advantages and disadvantages of nitrogen-containing fertilizers and insecticides. 5

ANSWER

	Advantages	Disadvantages
Nitrogen fertilizers	Boost crop yield and growth; supply essential nitrogen for proteins and chlorophyll; fast-acting and cost-effective	Cause water pollution and eutrophication (algal blooms) through runoff; soil acidification; nitrate leaching into groundwater; release of nitrous oxide (a potent greenhouse gas)
Insecticides	Protect crops from pest damage, increasing yield and food security; relatively cheap and effective in the short term	Kill beneficial insects such as pollinators; bioaccumulate in the food chain; lead to pest resistance over time; pose toxicity risks to humans and contaminate soil/water

Q.3 (a) Explain how temperature and light intensity affect the rate of photosynthesis in plants. 5

ANSWER

Light intensity: As light intensity increases, the rate of photosynthesis increases roughly proportionally, since more light energy is available to drive the light-dependent reactions. Beyond a certain intensity, the rate levels off (reaches saturation) because another factor — usually CO_2 concentration or temperature — becomes limiting.

Temperature: Photosynthesis is enzyme-driven (e.g., the enzyme Rubisco), so its rate increases with temperature up to an optimum (typically 25–35°C for most plants), as molecules move faster and enzyme activity rises. Beyond this optimum, the rate falls sharply as enzymes begin to denature.

Both relationships follow **Blackman's Law of Limiting Factors** — the rate of photosynthesis at any moment is limited by whichever factor (light, temperature, or CO_2) is in shortest supply.

Q.3 (b) Describe the structure and functions of capillaries in the human blood circulatory system. 5

ANSWER

Structure: Capillaries are the smallest blood vessels in the body (about 5–10 micrometres in diameter), with walls made of just a single layer of endothelial cells. They form an extensive branching network connecting the smallest arteries (arterioles) to the smallest veins (venules).

Function: Their extremely thin walls and slow blood flow allow efficient **exchange of oxygen, carbon dioxide, nutrients, and waste products** between the blood and surrounding tissue cells by diffusion. Capillaries also allow filtration of plasma fluid into tissues (forming interstitial fluid) and its reabsorption back into the bloodstream, playing a key role in fluid balance.

Q.3 (c) What is hepatitis? Give its types and briefly explain its common symptoms along with preventions. 5

ANSWER

Hepatitis is inflammation of the liver, most often caused by a viral infection, but also by toxins, alcohol, drugs, or autoimmune disease.

Types: Hepatitis A, B, C, D and E. A and E spread via the faecal–oral route (contaminated food/water) and are usually acute; B, C and D spread via blood and body fluids and can become chronic, risking cirrhosis or liver cancer.

Common symptoms: jaundice (yellowing of skin/eyes), fatigue, abdominal pain, nausea and vomiting, loss of appetite, dark urine, pale stools, and low-grade fever.

Prevention: vaccination (available for hepatitis A and B), safe drinking water and food hygiene, avoiding needle-sharing, screening of blood transfusions, and practising safe medical and sexual hygiene.

Q.3 (d) Differentiate between biomass and biogas. Briefly explain various methods for obtaining energy from biomass. 5

ANSWER

Biomass refers to organic matter derived from plants and animals — wood, crop residue, animal dung, and organic waste — used directly or converted as a source of energy. **Biogas** is a specific gaseous fuel (mainly methane and carbon dioxide) produced FROM biomass through anaerobic digestion by bacteria in the absence of oxygen. In short: biomass is the raw organic fuel, while biogas is one of the energy products derived from it.

Methods of obtaining energy from biomass:

- **Direct combustion** — burning wood or waste directly for heat
- **Anaerobic digestion** — bacterial breakdown of organic waste to produce biogas
- **Pyrolysis** — thermal decomposition without oxygen, yielding bio-oil, syngas and biochar
- **Fermentation** — converting sugars/starches into bioethanol
- **Gasification** — partial combustion producing combustible syngas

Q.4 (a) What is deforestation? State the disadvantages caused to the environment due to this. 5

ANSWER

Deforestation is the large-scale clearing or removal of forests and trees, usually to make way for agriculture, urbanisation, or logging.

Disadvantages:

- Loss of biodiversity through habitat destruction
- Soil erosion, since tree roots no longer bind the soil
- Disruption of the water cycle and reduced local rainfall
- Increased atmospheric CO_2 — loss of a major carbon sink, plus emissions from burning cleared vegetation, contributing to climate change
- Desertification of previously forested land
- Increased flooding, since less rainwater is absorbed by tree roots
- Loss of livelihoods for forest-dependent and indigenous communities

Q.4 (b) Explain how water pollution is produced. Describe the part played by bacteria after a river has been polluted by sewage. 5

ANSWER

Water pollution is produced when contaminants — domestic sewage, industrial effluents, agricultural runoff (fertilisers and pesticides), oil spills, and plastic waste — enter rivers, lakes, or oceans and degrade water quality.

Role of bacteria after sewage pollutes a river: Aerobic bacteria begin decomposing the organic matter in the sewage, consuming large amounts of dissolved oxygen (DO) in the process — this is measured as Biochemical Oxygen Demand (BOD). As dissolved oxygen falls, aquatic organisms such as fish suffocate and die. Once oxygen is severely depleted, anaerobic bacteria take over, producing foul-smelling and sometimes toxic gases (like hydrogen sulphide and methane). If the sewage also carries excess nutrients (nitrates/phosphates), it can trigger eutrophication — explosive algal growth that further depletes oxygen when the algae die and decompose.

Q.4 (c) State some examples of pollution caused by human activity and discuss the effects of each example. 5

ANSWER

Pollution Type	Human Cause	Effect
Air pollution	Vehicle exhaust, industrial emissions	Respiratory diseases, smog, climate change
Water pollution	Sewage and industrial discharge	Waterborne diseases, aquatic ecosystem collapse
Soil pollution	Pesticides, industrial/chemical waste	Reduced fertility, contamination of the food chain
Noise pollution	Traffic, machinery, construction	Hearing loss, stress, sleep disturbance
Plastic pollution	Packaging and litter	Marine animal deaths, microplastics entering the food chain

Q.4 (d) What does air pollution mean? State ten serious effects of air pollution on the environment and briefly explain how they can be reduced. 5

ANSWER

Air pollution is the presence of harmful substances — particulate matter, and gases such as CO, SO_2, NOx and ground-level ozone — in the atmosphere at concentrations that harm human health, other living organisms, and the environment.

Ten serious effects:

1. Respiratory diseases (asthma, bronchitis)
2. Cardiovascular disease
3. Global warming and climate change
4. Acid rain, damaging buildings, crops and water bodies
5. Depletion of the stratospheric ozone layer (from CFCs)
6. Reduced visibility due to smog
7. Harm to wildlife and ecosystems
8. Reduced agricultural crop yields
9. Eutrophication of water bodies from nitrogen deposition
10. Increased premature deaths and reduced life expectancy

Reduction measures: shifting to renewable energy, enforcing stricter vehicle-emission standards, promoting public transport, installing industrial emission-control filters, large-scale afforestation, banning harmful chemicals (e.g., CFCs), and raising public awareness.

Q.5 (a) Differentiate between food contaminants and food adulterants. 5

ANSWER

A **food contaminant** is any harmful biological, chemical, or physical agent that unintentionally enters food during production, processing, storage, or transport — for example, bacteria, pesticide residues, heavy metals, or foreign objects.

A **food adulterant** is a substance deliberately added to food (or a genuine ingredient intentionally removed) in order to increase quantity, improve appearance, or cut costs — at the expense of quality or safety — such as mixing chalk powder into flour or adding water to milk. Unlike contamination, adulteration is an intentional, often fraudulent act for economic gain.

Q.5 (b) Enlist major food groups based on nutrients, their functions and sources. 5

ANSWER

Food Group	Function	Sources
Carbohydrates	Primary energy source	Rice, bread, wheat, potatoes
Proteins	Growth and repair of body tissues	Meat, fish, eggs, legumes, dairy
Fats/Lipids	Energy storage, cell membranes, vitamin absorption	Cooking oils, butter, nuts
Vitamins & Minerals	Regulate body processes, immunity, bone health	Fruits and vegetables
Water	Hydration, transport medium, temperature regulation	Drinking water, fruits, soups

Q.5 (c) What is Artificial Intelligence and how does it differ from traditional programming? Describe the main branches of Artificial Intelligence. 5

ANSWER

Artificial Intelligence (AI) is a field of computer science that enables machines to simulate human intelligence — learning, reasoning, problem-solving, perception, and language understanding.

Difference from traditional programming: Traditional programming follows explicit, fixed rules coded by a programmer to produce a specific output for a given input. AI (especially machine learning) instead enables a system to learn patterns directly from data and improve its performance over time, making decisions based on learned models rather than hard-coded instructions for every possible scenario.

Main branches of AI: Machine Learning, Deep Learning, Natural Language Processing (NLP), Computer Vision, Robotics, Expert Systems, and Fuzzy Logic.

Q.5 (d) What are the advantages of optical fibers in communication systems? Draw/describe the basic structure of optical fiber and explain propagation of light through it. 5

ANSWER

Advantages of optical fibers: extremely high bandwidth/data capacity, very low signal loss over long distances, immunity to electromagnetic interference, lightweight and thin cables, high security (difficult to tap), and no electrical interference-related degradation.

Basic structure: an optical fiber consists of a **Core** (the central light-carrying region, made of glass/plastic with a higher refractive index), surrounded by **Cladding** (a layer with a lower refractive index), which is in turn covered by a protective outer **Buffer/Jacket** coating.

Propagation of light: Light enters the core and strikes the core–cladding boundary at an angle greater than the critical angle. Because the core has a higher refractive index than the cladding, the light undergoes **total internal reflection** at this boundary rather than escaping, so it bounces repeatedly along the length of the fiber with minimal loss, carrying data as pulses of light over long distances.

PART II — SECTION B (Quantitative Ability, 5 Marks per Part)

Q.6 (a) In an annual sale, Saima buys a Fridge and a Freezer. The sale offers 15% off everything and she pays a total of Rs. 57,120/-. The freezer's price before the sale is Rs. 40,000/-. What was the price of the Fridge before the sale? 5

SOLUTION

Let the fridge's original price = F.
Combined original price = F + 40,000
After a 15% discount, she pays 85% of the combined price:
0.85 × (F + 40,000) = 57,120
F + 40,000 = 57,120 ÷ 0.85 = 67,200
F = 67,200 − 40,000

FINAL ANSWER

Original price of the Fridge = Rs. 27,200

Q.6 (b) Mr. Rasheed pays a deposit of Rs. 60,000/- followed by 36 equal monthly payments. The total amount he pays is 127% of the basic price of Rs. 3,360,000/-. Calculate Rasheed's monthly payment. 5

SOLUTION

Total amount paid = 127% of 3,360,000 = 1.27 × 3,360,000 = Rs. 4,267,200
Amount to be paid via monthly instalments = Total − Deposit = 4,267,200 − 60,000 = Rs. 4,207,200
Monthly payment = 4,207,200 ÷ 36

FINAL ANSWER

Monthly payment = Rs. 116,866.67 (approx.)

Q.6 (c) Divide Rs. 600/- among A, B and C so that "Rs. 40 more than 2/5 of A's share", "Rs. 20 more than 2/7 of B's share" and "Rs. 10 more than 9/17 of C's share" are all equal. 5

SOLUTION

Let the common value be k. Then:
$(2/5)A + 40 = k \implies A = (5/2)(k - 40)$
$(2/7)B + 20 = k \implies B = (7/2)(k - 20)$
$(9/17)C + 10 = k \implies C = (17/9)(k - 10)$

Since A + B + C = 600, multiplying every term by 18 (LCM of 2, 2, 9) and simplifying gives:
$45(k-40) + 63(k-20) + 34(k-10) = 10{,}800$
$142k - 3{,}400 = 10{,}800 \implies 142k = 14{,}200 \implies k = 100$

$A = (5/2)(100-40) = (5/2)(60) = 150$
$B = (7/2)(100-20) = (7/2)(80) = 280$
$C = (17/9)(100-10) = (17/9)(90) = 170$

Check: 150+280+170 = 600 ✓ | (2/5×150)+40 = 100 ✓ | (2/7×280)+20 = 100 ✓ | (9/17×170)+10 = 100 ✓

FINAL ANSWER

A = Rs. 150, B = Rs. 280, C = Rs. 170

Q.6 (d) Find the correct words from the jumbled spellings: (i) TEANAIRM (ii) VAGNACEXETRA (iii) VADIELTIONC (iv) PKUNYBARTC (v) TAESROSNC 5

SOLUTION

- TEANAIRM → **MARINATE**
- VAGNACEXETRA → **EXTRAVAGANCE**
- VADIELTIONC → **VALEDICTION**
- PKUNYBARTC → **BANKRUPTCY**
- TAESROSNC → **ANCESTORS**

FINAL ANSWERS

MARINATE, EXTRAVAGANCE, VALEDICTION, BANKRUPTCY, ANCESTORS

Q.7 (a) Calculate the marked price of a sculpture sold for Rs. 79,950/- after an 18% discount. If instead a 10% discount is given on the marked price, followed by a further 8% discount, would the sale price still be Rs. 79,950/-? 5

SOLUTION

Marked price: Selling price = Marked Price × (1 − 0.18)
$79{,}950 = MP \times 0.82 \implies MP = 79{,}950 \div 0.82 = Rs.\ 97{,}500$

Testing successive discounts of 10% then 8%:
After 10% off: 97,500 × 0.90 = 87,750
After a further 8% off: 87,750 × 0.92 = Rs. 80,730

Comparing: successive discounts of 10% and 8% give a combined discount of only $1 - (0.90 \times 0.92) = 17.2\%$, which is **less** than a single 18% discount — so the final price is higher, not the same.

FINAL ANSWER

Marked Price = Rs. 97,500. No — the sale price would be Rs. 80,730, not Rs. 79,950, since two successive discounts of 10% and 8% (combined 17.2%) are less than a single 18% discount.

Q.7 (b) Majid pays a total of Rs. 51,520/- for his car insurance, made up of a basic charge plus 15% sales tax. Calculate the amount of sales tax that Majid pays. 5

SOLUTION

Let basic charge = B. Total = B × 1.15 = 51,520
B = 51,520 ÷ 1.15 = Rs. 44,800
Sales tax = Total − Basic charge = 51,520 − 44,800

FINAL ANSWER

Sales tax = Rs. 6,720

Q.7 (c) A rectangular camp site has sides (3x+6) m and (x+1) m, and a diagonal of (4x+1) m. Find the area and perimeter of the camp site. 5

SOLUTION

By Pythagoras' theorem (diagonal² = length² + width²):
$(4x+1)^2 = (3x+6)^2 + (x+1)^2$
$16x^2 + 8x + 1 = (9x^2 + 36x + 36) + (x^2 + 2x + 1)$
$16x^2 + 8x + 1 = 10x^2 + 38x + 37$
$6x^2 - 30x - 36 = 0 \implies x^2 - 5x - 6 = 0 \implies (x-6)(x+1) = 0$
$x = 6$ ($x = -1$ rejected, since side lengths must be positive)

Length = 3(6)+6 = 24 m, Width = 6+1 = 7 m, Diagonal = 4(6)+1 = 25 m
Check: $24^2 + 7^2 = 576 + 49 = 625 = 25^2$ ✓ (the classic 7–24–25 Pythagorean triple)

Area = 24 × 7 = 168 m²
Perimeter = 2 × (24 + 7) = 2 × 31 = 62 m

FINAL ANSWER

Area = 168 m² | Perimeter = 62 m

Q.7 (d) Arrange the following fractions in descending order. 5

SOLUTION

Converting each fraction to its decimal value for comparison:

Set	Descending Order				
(a)	9/14	25/42	7/12	4/7	—
(b)	5/8	7/12	5/9	13/24	—
(c)	2/7	4/15	5/21	6/35	—
(d)	6/11	13/25	7/15	9/20	2/5
(e)	3/8	4/13	5/17	2/7	1/5

FINAL ANSWERS

(a) 9/14 > 25/42 > 7/12 > 4/7
(b) 5/8 > 7/12 > 5/9 > 13/24
(c) 2/7 > 4/15 > 5/21 > 6/35
(d) 6/11 > 13/25 > 7/15 > 9/20 > 2/5
(e) 3/8 > 4/13 > 5/17 > 2/7 > 1/5

Q.8 (a) A train covers 68m, 127m, 208m, 312m and 535m in its first five successive minutes, then maintains an average speed of 33 km/hr for the next 5 minutes. Find the whole distance covered and the average speed over the total journey. 5

SOLUTION

Distance in first 5 minutes = 68+127+208+312+535 = 1,250 m
Distance in next 5 minutes at 33 km/hr = 33 × (5/60) km = 2.75 km = 2,750 m
Total distance = 1,250 + 2,750 = 4,000 m = 4 km

Total time = 5 + 5 = 10 minutes = 1/6 hour
Average speed = Total distance ÷ Total time = 4 km ÷ (1/6 hr) = 24 km/hr

FINAL ANSWER

Total distance = 4,000 m (4 km) | Average speed = 24 km/hr

Q.8 (b) A solid cuboid has a base 10 cm by 6 cm, height 'y' cm, and total surface area 376 cm². Find the height of the cuboid. 5

SOLUTION

Total Surface Area of a cuboid = 2(lw + lh + wh)
$376 = 2[(10\times6) + (10\times y) + (6\times y)]$
$376 = 2[60 + 16y]$
$188 = 60 + 16y$
$16y = 128$

FINAL ANSWER

Height (y) = 8 cm

Q.8 (c) In a six-member family (A, B, C, D, E, F) there are two fathers, three brothers and one mother. C is the sister of F. B is the brother of E's husband. D is the father of A and grandfather of F. Who is E's husband? 5

SOLUTION

From the clues:

- D is the father of A, and D is also the grandfather of F → A must be a parent of F.
- C is the sister of F → C and F are siblings, both children of A (and A's spouse).
- B is the brother of E's husband → E's husband has a brother named B, meaning E's husband is also a son of D (making him A, since D's known children include A).

Putting this together: D is the father of A and B (two brothers). A marries E, and their children are C and F (siblings — F is male, "brother" of C, satisfying the "three brothers": A, B, and F across the family). Since D is A's father and A is F's parent, D is correctly F's grandfather — all clues are satisfied consistently with **A being E's husband**.

FINAL ANSWER

E's husband is A

Q.8 (d) How many prime numbers lie between each of the following pairs of numbers? 5

SOLUTION

Pair	Approx. Range	Integers in Range	Primes	Count
a) $\sqrt{3}$ and $\sqrt{120}$	1.73 to 10.95	2–10	2, 3, 5, 7	4
b) $\sqrt{10}$ and $\sqrt{410}$	3.16 to 20.25	4–20	5, 7, 11, 13, 17, 19	6
c) $\sqrt[3]{10}$ and $\sqrt[3]{999}$	2.15 to 9.997	3–9	3, 5, 7	3
d) $\sqrt[3]{28}$ and $\sqrt{120}$	3.04 to 10.95	4–10	5, 7	2
e) $\sqrt{8}$ and $\sqrt{400}$	2.83 to 20	3–19	3, 5, 7, 11, 13, 17, 19	7

FINAL ANSWERS

(a) 4 primes (b) 6 primes (c) 3 primes (d) 2 primes (e) 7 primes