

Group A

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1. Queen bee lives from 2 to 5 years. The drone bee lives for two months. Worker bee lives for 6 weeks to 6 months.
 2. The queen bee lays up to 3000 eggs per day.



3. A human cell has 46 chromosomes (23 pairs). 22 pairs of somatic chromosomes. One pair of sex chromosomes. A zygote receives 23 chromosomes from a male and 23 chromosomes from a female.

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4. The first research on artificial insemination was performed on dogs in 1784 by Lazzaro Spallanzani.
 5. First IVF baby (test tube baby) is Louise Joy Brown born on 25th July 1978.
 6. First test tube baby in Nepal is Om Mani Tamang born on March 3, 2005.
 7. The first IVF centre was started in OM Hospital in 2004 in Nepal.

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8. 55% of blood is plasma and 45% is blood cells. 80% to 90% of plasma is made of water and 10 % to 20 % is a mixture of carbohydrates, salt, fat, protein, etc.
 9. There are 45 lakhs to 50 lakhs RBC, 4 thousand to 11 thousand WBC and 2 to 4 lakhs platelets per cubic millimetre of blood.
 10. RBC lives for 90 to 120 days. WBC lives for two weeks. Platelets live for 2 to 3 days.

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11. The heart beats 60 to 100 times per minute in a healthy adult.
 12. Tachycardia means heart beats more than 100 times per minute.
 13. Bradycardia means heart beats less than 60 times per minute.

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14. Systolic blood pressure is 90 mmHg to 130 mmHg in a healthy adult.
 15. Diastolic blood pressure is 60 mmHg to 90 mmHg in a healthy adult.
 16. Average blood pressure in a healthy adult is 120/80 mmHg.
Numerator 120 mmHg is systolic pressure and denominator 80 mmHg is a diastolic pressure.
 17. If blood pressure exceeds 140/90 mmHg, it is called high blood pressure.



18. The temperature of Nepal is increasing at the rate of 0.06°C each year.



19. The average value of g at the equatorial region is 9.78 m/s^2 . The average value of 'g' at the polar region is 9.83 m/s^2 . The average value of 'g' on Earth is 9.81 m/s^2 .

Value of gravitational constant is $6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$.



20. Absolute zero means zero thermal energy, zero kinetic energy of molecules and temperature of 0K (-273.15°C).



21. The near point of the human eye is 25 cm.
The far point of the human eye is at a
distance of infinity.



22. The frequency of alternating current is 50 Hz in Nepal.

23. The voltage of alternating current is 220 V to 240 V in Nepal.

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24. Hubble discovered in 1929 that the universe is expanding.
 25. Hubble's constant is 73km/s/Mpc .

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26. The molecular weight of carbon dioxide is 44 amu. Carbon dioxide is 1.5 times heavier than air. Carbon dioxide solidifies at -78°C and changes into dry ice.
 27. Carbogen is a mixture of 95% oxygen and 5% carbon dioxide.
 28. Ammonia changes into liquid at -33.4°C and solidifies at -78°C .
 29. The pH value of acid rain is 3 to 5.

Group B



1. A fish has two chambers, amphibia has three chambers, reptiles have three chambers, birds have four chambers and mammals have four chambers in the heart.

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2. Queen bees and worker bees have 32 chromosomes but drones have 16 chromosomes only.
 3. There is one queen bee, a few hundred drones and 20,000 to 80,000 worker bees in a hive.
 4. The queen bee lays eggs after 2 to 3 days of mating.
 5. The egg stage of a bee lasts for 3 days.
 6. The larval stage of the queen bee lasts 5.5 days. The larval stage worker bee lasts for 6 days. The larval stage of the drone bee lasts for 7 days. A larvae of bee moults 4 to 5 times.

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7. The pupa of the queen bee lasts for 7.5 days. The pupa of worker bees last for 12 days. The pupa of the drone bee lasts for 14 days.
 8. A queen bee is formed in 16 days. A worker bee is formed in 21 days. A drone bee is formed in 24 days.
 9. The royal jelly is made of 80 to 85 % carbohydrate, 15 to 17 % water, 0.3 % protein, 0.2 % amino acid, vitamin, etc.

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10. Mitosis cell division produces 2 daughter cells.
 11. Meiosis cell division produces 4 daughter cells.
 12. Gorillas have 48 chromosomes.
 13. Mendel choose 7 pairs of contrasting characteristics of the pea plant for crossing.

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14. In a monohybrid cross, 100% of offspring are hybrid in the first filial generation. 50% hybrid, 25% pure dominant and 25% pure recessive offspring in a second filial generation. The dominant character is seen in 75% of offspring in the second filial generation.
 15. Phenotype ratio of a monohybrid cross is 3:1. Genotype ratio of a monohybrid cross is 1:2:1.

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16. There are 5.5 litres of blood in the adult human body. pH of human blood ranges from 7.35 to 7.45.
 17. About 20 lakhs RBC is formed per second. About 20 lakh RBCs dies per second.
 18. A human heart weighs 300 grams in an adult person.
 19. A human heart has four chambers. They are two auricles and two ventricles.

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- 20. A human heart has four valves.
 - 21. A male above the age of 45 and a female above the age of 55 has a greater risk of heart attack.
 - 22. A heart pumps 5 to 6 litres of blood per minute.

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23. Protected species in Nepal: 27 species of mammals, 9 species of birds and 3 species of reptiles.
 24. 700 species of medicinal plants are found in Nepal.
 25. Yarshagumba grows at an altitude of 3000 m to 5000 m.

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26. The mass of the earth is 5.972×10^{24} kg.
 27. The average radius of the earth is 6371 km.
 28. The value of 'g' at sea level where the average radius is 6371 km is equal to 9.81 m/s^2 . It is rounded to 9.8 for easier calculation. Sometimes it is rounded to 10 m/s^2 .
 29. Acceleration is zero if an object is falling or travelling at a uniform velocity.

30. Average value of acceleration due to gravity on various celestial objects.

Celestial objects	Average value of 'g'
Moon	1.63 m/s ²
Mercury	3.61 m/s ²
Mars	3.75 m/s ²
Venus	8.83 m/s ²
Earth	9.81 m/s ²

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31. The density of aluminium is 2700 kg/m^3 . The density of water is 1000 kg/m^3 .
32. Anomalous expansion of water occurs at the temperature range of 0°C to 4°C . Water has the highest volume and least density at 0°C . Water has the highest density and least volume at 4°C .

33. Substances and their specific heat capacities.

Substance	Specific heat capacity
Water	4200 J/kg°C
Ice	2100 J/kg°C
Aluminium	900 J/kg°C
Ethyl alcohol	2400 J/kg°C
Iron	460 J/kg°C
Kerosene oil	2010 J/kg°C
Copper	385 J/kg°C
Silver	236 J/kg°C
Mercury	140 J/kg°C
Gold	130 J/kg°C

34. Lower fixed point (temperature of melting ice at sea level at 1 atm pressure) and upper fixed point (temperature of the steam just above the boiling water at sea level at 1 atm pressure) of temperature scales.

		Celsius scale	Kelvin scale	Fahrenheit scale
Lower point	fixed	0°C	273 K	32 °F
Upper point	fixed	100°C	373 K	312 °F

35. Medium and Speed of light

Medium	Speed of light
Air	$3 \times 10^8 \text{m/s}$
Water	$2.25 \times 10^8 \text{m/s}$
Alcohol	$2.19 \times 10^8 \text{m/s}$
Kerosene oil	$2.08 \times 10^8 \text{m/s}$
Glass	$2 \times 10^8 \text{m/s}$
Diamond	$1.24 \times 10^8 \text{m/s}$
Glycerine	$2.04 \times 10^8 \text{m/s}$

36. Medium, refractive index and critical angle

Medium	Refractive index	Critical angle
Air	1	
Water	1.33	49°
Alcohol	1.36	48°
Kerosene oil	1.44	44°
Glass	1.5	42°
Diamond	2.42	24°
Glycerine	1.47	43°

37. Colour of light and wavelength

Colour of light	Range of wavelength
Red	$6.2 \times 10^{-7}\text{m}$ to $7.8 \times 10^{-7}\text{m}$
Orange	$5.9 \times 10^{-7}\text{m}$ to $6.2 \times 10^{-7}\text{m}$
Yellow	$5.8 \times 10^{-7}\text{m}$ to $5.9 \times 10^{-7}\text{m}$
Green	$5.0 \times 10^{-7}\text{m}$ to $5.8 \times 10^{-7}\text{m}$
Blue	$4.6 \times 10^{-7}\text{m}$ to $5.0 \times 10^{-7}\text{m}$
Indigo	$4.4 \times 10^{-7}\text{m}$ to $4.6 \times 10^{-7}\text{m}$
Violet	$3.8 \times 10^{-7}\text{m}$ to $4.4 \times 10^{-7}\text{m}$

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38. Advanced and cheaper acrylic or silicon-based Intraocular lenses were invented by Dr Sanduk Ruit in 1995.
 39. The refractive index of the cornea is 1.376. The converging power of the cornea is + 43 D.
 40. Cornea is harvested within 8 to 12 hours of the demise of the donor.

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41. Frequency of DC is zero.
 42. Nepal Electricity Authority was producing 2200 MW of electricity by 2022 AD. The thermal powerplant at Dubahi and Hetauda produces 487 MW of electricity. Upper Arun Project, Uttar Ganga Project and Dudha Koshi Project produce 3219 MW of electricity.
 43. Transmission sub-station at Dhanusa, Dhalkedever transmits AC at 400kV.

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44. Our solar system lies at a distance of 30,000 light years from the centre of the Milky Way galaxy.
 45. The diameter of the Milky Way galaxy is 100,000 light years.
 46. There are about 1.5 billion stars in the Milky Way galaxy.
 47. If two galaxies are 1 Megaparsec apart they will be separated from each other by a relative velocity of 73 km/s.

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48. There are 7 periods and 18 groups in a modern periodic table.
49. Sub-shell s, p, d and f can hold 2, 6, 10 and 14 electrons respectively.

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50. The molecular weight of ammonia is 17 amu.
 51. The molecular weight of nitrogen is 28 amu. The molecular weight of oxygen is 32 amu.
 52. Ammonium chloride and calcium hydroxide are mixed in a ratio of 2:1 during laboratory preparation of ammonia gas.
 53. The pH value of regular monsoon rain is 6.



54. The crust of the earth is made of 90% of silicate minerals.

55. Haematite has 75% iron.



56. Sajiban seed contains 30 to 48 % of oil. 3 kilograms of Sajiban gives 1 litre of biodiesel.

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57. DDT was introduced in Nepal in 1952. 80% of pesticides mix in the soil.
 58. The use of pesticides in Nepal is 396 grams per hectare.

59. SI unit of some physical quantity.

Physical quantity	SI unit	Symbol
Length	Meter	m
Mass	Kilogram	kg
Time	Second	s
Temperature	Kelvin	K
Luminous intensity	Candela	cd
Electric current	Ampere	A
Amount of substance	Mole	mol
Acceleration due to gravity		m/s^2
Unthrust	Newton	N

Group C



1. Two-kingdom system has 2 kingdoms but the five-kingdom system has 5 kingdoms.

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2. Size of bee: 9 mm to 20 mm in length. Three segments in the thorax, two legs from each segment. Six legs in total. Two pairs of wings. 9 segments in the abdomen but 6 prominent in females, 7 prominent in males.
 3. There are four stages in the life cycle of a bee.
 4. The length of an egg of a bee is 1 to 1.5 mm.

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5. The worker bees of ages 1 to 3 days clean the hive and keep the hive warm.
 6. The worker bees of age 3 to 6 days feed other larvae.
 7. The worker bees aged 6 to 12 days produce royal jelly.
 8. The worker bees aged 12 to 18 days help in the construction of the hive.
 9. The worker bee aged 18 to 20 days helps in defence.
 10. The worker bee of age more than 21 days goes for pollination.

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11. DNA has 4 nitrogen bases. RNA has 4 nitrogen bases.
 12. DNA and RNA are 2 nucleic acids.
 13. There are 3 types of RNA.
 14. Mendel was born on 22 July 1822 in Austria. He is the father of genetics.



15. 2/3 of the heart lies in the left of the thoracic cavity.
16. If blood pressure is below 60/90 mmHg, it is called low blood pressure.

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17. The climate of a place is an average atmospheric condition of 30 years.
 18. 70% of solar radiation that enters the atmosphere and reaches Earth is absorbed. Only 30% radiates back to space.
 19. More than 7000 species of flowering plants grow in Nepal.



20. The universal law of gravitation was propounded in 1687.

21. The value of G was calculated in 1798 by Henry Cavendish.



22. Pascal's law was propounded in 1653.

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23. The angle of refraction corresponding to the critical angle is 90° .
 24. Data transfer rate in optical fibre is 1 Gbps.
 25. If a person has long-sightedness the near point is longer than 25 cm.
 26. If a person has short-sightedness the far point is shorter than infinity at a finite distance from the eye.

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27. The magnetic effect of current was discovered in 1820 by Hans Christian Oersted.
 28. Electromagnetic induction was discovered by Michael Faraday in 1831.
 29. Voltaic cell was the main source of current in 1800 AD.
 30. The voltage of A.C from generators of hydropower to transmission substation is around 132 kV. The voltage of AC from the transmission substation to the distribution substation is around 400 kV. The voltage of AC from the distribution substation to consumers is 220V to 240V.



31. 4 bits equal to 1 nibble. 8 bits (2 nibbles) equal to 1 byte. 1024 bytes equals 1 kB. 1024 kB equals 1 MB. 1024 MB equals 1 GB. 1024 GB equals 1 TB.

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- 32. There are 118 elements. 92 of them are natural and 26 are prepared in the laboratory.
 - 33. Modern periodic law was formulated in 1913 AD
 - 34. The first period has 2 elements. The second and third periods have 8 elements each. The fourth and fifth periods have 18 elements each. The sixth and seventh periods have 32 elements each.
 - 35. There are 15 lanthanides and 15 actinides.

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36. Carbon dioxide was discovered by Jan Baptist van Helmont in 1630 by burning wood.
 37. Carbon dioxide was prepared by Joseph Black in 1755 by heating magnesium carbonate.
 38. Ammonia reacts with oxygen in the presence of a platinum catalyst to produce nitric oxide at 800°C .

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- 39. Bauxite has 40% to 60% aluminium.
 - 40. Chalcopyrite has 34.5 % copper.
 - 41. Argentite has 87% silver.
 - 42. Electrowinning produces 99% pure metals.



43. The molecular weight of two adjacent members of a homologous series differs by 14 amu.



Thank You