MDCAT (UHS entry test) — 2017 · Solved Past Paper

Body: University of Health Sciences, Lahore (UHS) · **Post:** MDCAT (UHS entry test) · **Year:** 2017 · **Questions:** 220 in the original paper — **212 solved and verified**, 4 excluded as defective (Q110, Q187, Q209, Q212), 4 unrecoverable (Q217, Q218, Q219, Q220) · **Price:** Free

> **How to use this paper:** each question shows the stem, the four options, and the correct answer. Click “Why each option?” under a question to see all four options explained — one question teaches four topics. General Knowledge answers are as of the 2017 sitting.

Source note: mdcatguide.com compilation 'UHS MDCAT 2017' (56 pages), compiled by NOORMOBIN (FB group MCAT2017 / page MCATNotesAndPapers), served via noteslelo.pk (UHS MDCAT 2017, 2.5 MB; accessed 14 Nov 2026). This is the 20 August 2017 sitting (Paper ID-A), 220 MCQs, 150 minutes, 1100 marks, negative marking −1 per wrong answer; the sitting was CANCELLED after a paper leak (Lahore High Court annulled the results) and reconducted 29 October 2017 — the reconduct is a separate sitting and is not built here. The official UHS answer key is printed at the back of the same file (Biology pp. 47–48, Physics p. 49, English p. 50, Chemistry p. 51) and marks 7 items X. Cross-checked against the educationinkarachi.net reproduction and parhaikrlo.com's MDCAT 2017 paper. Subjects follow served content: Biology Q1–88, Physics Q89–132, English Q133–162, Chemistry Q163–Q220. 212 solved (207 VERIFIED + 5 PICK-ONE); 4 DEFECTIVE-excluded (Q110, Q187, Q209, Q212); 4 GAP unrecoverable (Q217–Q220, illegible in every copy checked). 7 printed-key corrections. Answers verified independently against reference facts, worked derivations and targeted sources, never from the printed key alone. Decisions by the assistant under the owner's 8 Nov 2026 delegation.

1 Biology

Low partial pressure of oxygen in tissues favours _____ of oxyhaemoglobin.

- A. Dissociation ✓ **Correct answer**
- B. Formation
- C. Stability
- D. Transformation

A. low O2 partial pressure in the tissues favours the dissociation (release) of oxygen from oxyhaemoglobin, delivering O2 where it is needed.

B. oxyhaemoglobin forms in the lungs, where O2 partial pressure is high, not in the tissues.

C. low O2 pressure destabilises oxyhaemoglobin rather than stabilising it.

D. there is no such transformation step in oxygen transport. (Key: Biology Q1 = A.)

Question 2 Biology

Respiratory tubules are termed as bronchioles when they attain the diameter _____ or lesser:

- A. 1.2cm
- B. 1cm
- C. 1mm ✓ **Correct answer**
- D. 1.2mm

A. 1.2 cm airways are bronchi, not bronchioles.

B. 1 cm airways are still bronchi.

C. airways of 1 mm diameter or less are bronchioles (terminal bronchioles are ~0.5–1 mm).

D. above the 1 mm threshold, so still a bronchus. (Key: Biology Q2 = C.)

3 Biology

Elastic fibres are absent in the walls of _____:

- A. Aorta
- B. Arteries
- C. Veins
- D. Capillaries ✓ **Correct answer**

A. the aorta's wall is rich in elastic fibres (that is what lets it stretch and recoil).

B. arteries have elastic fibres in their tunica media.

C. veins do have elastic fibres (fewer than arteries, in the tunica media and adventitia), so they are not the answer.

D. a capillary wall is a single layer of endothelial cells on a basement membrane, with no elastic fibres (and no smooth muscle) at all. (Key: Biology Q3 = C — WRONG. The printed key is corrected C→D; the science is unambiguous — only capillaries lack elastic fibres entirely.)

Question 4 Biology

A type of blood cell that produces heparin is _____:

- A. Basophil ✓ **Correct answer**
- B. Neutrophil
- C. Eosinophil
- D. Monocyte

A. basophils (with mast cells) secrete heparin, an anticoagulant, and histamine.

B. phagocytic, does not produce heparin.

C. acts against parasites and in allergy, does not produce heparin.

D. becomes a macrophage, does not produce heparin. (Key: Biology Q4 = A.)

5 Biology

Thoracic lymph duct of the lymphatic system opens into _____:

- A. Superior vena cava
- B. Subclavian Vein ✓ **Correct answer**
- C. Inferior vena cava
- D. Renal vein

A. the thoracic duct does not open into the superior vena cava.

B. the thoracic duct drains lymph into the left subclavian vein (at its junction with the left internal jugular vein).

C. drains the lower body to the heart, not a lymph opening.

D. drains the kidney, not a lymph opening. (Key: Biology Q5 = B.)

Question 6 Biology

Select the part of nephron which is NOT permeable to water and stops its outflow:

- A. Glomerulus
- B. Proximal Tubule
- C. Ascending loop ✓ **Correct answer**
- D. Descending loop

A. the glomerulus filters water out of the blood (it is where filtration happens, not a water barrier).

B. freely permeable to water; most water is reabsorbed here.

C. the ascending limb of the loop of Henle is impermeable to water (only salts are reabsorbed), so water cannot leave the tubule here.

D. the descending limb IS permeable to water (water leaves into the hypertonic medulla). (Key: Biology Q6 = C.)

7 Biology

Vessels which carry blood to the glomerulus are called:

- A. Efferent arterioles
- B. Renal vein
- C. Vasa recta
- D. Afferent arterioles ✓ **Correct answer**

A. carry blood AWAY from the glomerulus.

B. drains blood out of the kidney.

C. the peritubular capillaries of the medulla (vasa recta), not the vessel into the glomerulus.

D. carry blood INTO the glomerulus. (Key: Biology Q7 = D.)

Note: Filed option C read "Vesa recta" (misprint in the source reproduction); corrected to "Vasa recta" as documented in the reviewed file.

Question 8 Biology

In ECG, QRS wave represents:

- A. Ventricular systole ✓ **Correct answer**
- B. Atrial systole
- C. Diastole
- D. Recovery systole

A. the QRS complex is ventricular depolarisation, which triggers ventricular contraction (systole). The paper prints a small ECG trace (P, Q, R, S, T waves against time, QRS complex labelled) with the question.

B. that is the P wave.

C. the resting phase between beats, not the QRS.

repolarisation) of the ventricles is the T wave, not the QRS. (Key: Biology Q8 = A.)

Question 9 Biology

When water content in body becomes high, what will happen:

- A. ADH release will be inhibited ✓ **Correct answer**
- B. ADH will be released in large amount
- C. Aldosterone will be released
- D. Anterior pituitary will produce ADH

A. high body water suppresses ADH release from the posterior pituitary, so the collecting duct stays impermeable and excess water is excreted as dilute urine.

B. the opposite: ADH is released when water is LOW.

C. aldosterone regulates Na+ (and so water indirectly), but it is not the response to high water content.

D. ADH is made in the hypothalamus and released by the POSTERIOR pituitary, not the anterior. (Key: Biology Q9 = A.)

Question 10 Biology

The major factor in producing hypertonic urine is:

- A. Glomerulus
- B. Influence of aldosterone
- C. ADH influencing on collecting duct ✓ **Correct answer**
- D. Gradual increase in osmolarity from cortex to inner medulla

A. the glomerulus only filters; it does not concentrate urine.

B. aldosterone acts on Na+ reabsorption (distal tubule/collecting duct), not on the water permeability that makes urine hypertonic.

…es the collecting duct permeable to water, so water is reabsorbed into the hypertonic medulla and concentrated (hypertonic) urine is produced; this is the factor the FSc text names for hypertonic urine.

D. the medullary osmotic gradient is the precondition that makes concentration possible, but it is ADH's action on the collecting duct that actually produces hypertonic urine. (Key: Biology Q10 = C.)

Note: Filed option D read "Gradual increase in osmolarity from cortex to inner medula" (misprint in the source reproduction); corrected to "Gradual increase in osmolarity from cortex to inner medulla" as documented in the reviewed file.

Question 11 Biology

What is the least selective process during urine formation:

- A. Reabsorption
- B. Pressure filtration ✓ **Correct answer**
- C. Secretion
- D. Differential permeability

A. selective: specific substances are reabsorbed by carrier-mediated transport.

B. glomerular filtration is non-selective: all small molecules (water, salts, glucose, urea) pass through the filtration membrane indiscriminately; only cells and large proteins are held back by size.

C. selective transport of specific ions/drugs into the tubule.

D. a property of membranes, not a process of urine formation. (Key: Biology Q11 = B.)

Note: Filed option B read "Pressure filteration" (misprint in the source reproduction); corrected to "Pressure filtration" as documented in the reviewed file.

12 Biology

The nerve impulse which jumps from node to node in myelinated neurons is called as:

- A. Resting membrane potential
- B. Saltatory nerve impulse ✓ **Correct answer**
- C. Threshold stimulus
- D. Initial nerve impulse

A. the voltage across the membrane at rest (−70 mV), not a moving impulse.

B. in myelinated axons the impulse jumps from one node of Ranvier to the next (saltatory conduction), which is much faster than continuous conduction.

C. the minimum stimulus that triggers an action potential.

D. not a named conduction mode. (Key: Biology Q12 = B.)

Question 13 Biology

The CNS is protected by:

- A. Three layers of meninges ✓ **Correct answer**
- B. One layer of meninx
- C. 4 layers of meninges
- D. 2 layers of meninges

A. dura mater, arachnoid mater and pia mater (three meninges protect brain and spinal cord).

B. wrong count, and "moninx" is a misprint for "meninx" (filed as printed).

C. there are three, not four.

D. there are three, not two. (Key: Biology Q13 = A.)

Note: Filed option B read "One layer of moninx" (misprint in the source reproduction);

"One layer of meninx" as documented in the reviewed file.

Question 14 Biology

White matter of spinal cord is made up of:

- A. Sensory nerve fibres
- B. Myelinated nerve fibres ✓ **Correct answer**
- C. Motor nerve fibres
- D. Mixed nerve fibres

A. sensory fibres run in the white matter but do not define it.

B. white matter is white because it is packed with myelinated axons (myelin is fatty and white); grey matter holds the cell bodies.

C. motor fibres also run in the white matter but do not define it.

D. white matter contains both sensory and motor tracts, but its defining composition is myelinated fibres. (Key: Biology Q14 = B.)

Question 15 Biology

There are evidences that high levels of aluminum can lead to the onset of:

- A. Parkinson's disease
- B. Alzheimer's disease ✓ **Correct answer**
- C. Lesch-Nyhan syndrome
- D. Fragile X-syndrome

A. loss of dopamine-producing neurons; not linked to aluminium.

B. aluminium accumulation in the brain is associated with the onset of Alzheimer's disease (FSc text).

C. an HGPRT enzyme deficiency (purine metabolism), not aluminium.

somal (X) disorder, not aluminium. (Key: Biology Q15 = B.)

Question 16 Biology

_____ is the structure in female reproductive system in which fertilization takes place:

- A. Ovaries
- B. Uterus
- C. Cervix
- D. Oviduct ✓ **Correct answer**

A. produce the eggs; fertilisation does not happen there.

B. the site of implantation and foetal development, not fertilisation.

C. the neck of the uterus, a passage, not the fertilisation site.

D. fertilisation occurs in the oviduct (fallopian tube, ampulla), where sperm meets the egg. (Key: Biology Q16 = D.)

Question 17 Biology

Which of the following directly develops into sperms:

- A. Primary spermatocytes
- B. Spermatids ✓ **Correct answer**
- C. Secondary spermatocytes
- D. Spermatogonia

A. divide by meiosis I into secondary spermatocytes, two steps from sperms.

B. spermatids differentiate directly into spermatozoa (spermiogenesis), the last step.

C. divide by meiosis II into spermatids, one step before spermatids.

D. the stem cells that start spermatogenesis, several steps from sperms. (Key: Biology Q17

Question 18 Biology

FSH stimultes the production of oestrogen hormone which has two targets _____ and _____:

- A. Uterus, posterior pituitary
- B. Ovaries, uterus
- C. Uterus, anterior pituitary ✓ **Correct answer**
- D. Ovaries, hypothalamus

A. the uterus is a target, but the posterior pituitary (ADH/oxytocin) is not an oestrogen target.

B. the ovaries are the SOURCE of oestrogen, not its target.

C. oestrogen acts on the uterus (endometrial growth) and feeds back on the anterior pituitary to regulate FSH/LH.

D. the ovaries are the source, not a target. (Key: Biology Q18 = C. "stimultes" is filed as printed — a misprint for "stimulates".)

Question 19 Biology

Select the organelle which is only present in animal cells:

- A. Centrioles ✓ **Correct answer**
- B. R.E.R
- C. Microtubules
- D. Ribosomes

A. centrioles (which form the spindle and cilia/flagella bases) are present in animal cells and absent in most higher plant cells.

B. rough endoplasmic reticulum occurs in both plant and animal cells.

both plant and animal cells (cytoskeleton).

D. occur in both plant and animal cells (protein synthesis). (Key: Biology Q19 = A.)

Question 20 Biology

Syphillis is a sexually transmitted disease and can also damage:

- A. Hair
- B. Heart ✓ **Correct answer**
- C. P.N.S
- D. Birth canal

A. syphilis can cause hair loss in the secondary stage, but the question asks what it "can also damage" in the serious systemic sense.

B. tertiary syphilis damages the heart and aorta (cardiovascular syphilis); this is the textbook answer.

C. neurosyphilis affects the central nervous system (brain/spinal cord), not primarily the peripheral nervous system.

D. not a site of syphilitic damage. (Key: Biology Q20 = B. "Syphillis" is filed as printed — a misprint for "Syphilis".)

Question 21 Biology

Spongy bone is always surrounded by:

- A. Compact bone ✓ **Correct answer**
- B. Cartilage
- C. Osteoblast cells
- D. Osteoclast cells

A. spongy (cancellous) bone forms the interior of a bone and is always enclosed by a shell of compact bone.

nt surfaces, but does not surround spongy bone.

C. bone-forming cells, not a surrounding layer.

D. bone-resorbing cells, not a surrounding layer. (Key: Biology Q21 = A.)

Question 22 Biology

Bone matrix is hardened by the:

- A. Haversian canals
- B. Canaliculi
- C. Bone marrow tissues
- D. Calcium phosphate ✓ **Correct answer**

A. carry blood vessels and nerves through compact bone; they do not harden the matrix.

B. canaliculi are tiny channels linking osteocytes; they do not harden the matrix ("Canaliculfs" filed as printed — a misprint for "Canaliculi").

C. marrow fills the cavities; it does not harden the matrix.

D. calcium phosphate (hydroxyapatite) mineralises and hardens the bone matrix. (Key: Biology Q22 = D.)

Note: Filed option B read "Canaliculfs" (misprint in the source reproduction); corrected to "Canaliculi" as documented in the reviewed file.

Question 23 Biology

The number of bones forming skull in man is:

- A. 8
- B. 14
- C. 20
- D. 22 ✓ **Correct answer**

inber of CRANIAL bones only.

B. 14 is the number of FACIAL bones only.

C. not the skull total.

D. the human skull has 22 bones in total (8 cranial + 14 facial). (Key: Biology Q23 = D.)

Question 24 Biology

The spine consists of linear series of :

- A. 33 bones ✓ **Correct answer**
- B. 24 bones
- C. 12 bones
- D. 7 bones

A. the vertebral column has 33 vertebrae (7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral, 4 fused coccygeal).

B. 24 is the number of movable (presacral) vertebrae, not the whole column.

C. 12 is the number of thoracic vertebrae only.

D. 7 is the number of cervical vertebrae only. (Key: Biology Q24 = A.)

Question 25 Biology

W.O.F changes occurs when skeletal muscles contract:

- A. I-band shortens only
- B. A-band shortens and Z-lines move apart
- C. I-band shortens and Z-lines come close to each other ✓ **Correct answer**
- D. Actin filament contracts

A. the I-band does shorten, but the Z-lines also move closer; "only" makes this incomplete.

both counts: the A-band stays the same length and the Z-lines move closer.

C. sliding filament theory: actin slides over myosin, the I-band shortens and the Z-lines are pulled together (A-band unchanged).

D. actin filaments do not contract; they slide past myosin. (Key: Biology Q25 = C.)

Question 26 Biology

The thyroxine hormones of thyroid glands act directly on:

- A. Iodine metabolism
- B. Protein metabolism
- C. Glucose metabolism
- D. Basal metabolic rate ✓ **Correct answer**

A. iodine is the raw material for thyroxine, not its target action.

B. thyroxine affects protein metabolism, but indirectly, as part of raising metabolic rate.

C. thyroxine affects glucose metabolism, but indirectly.

D. thyroxine's defining direct action is to raise the basal metabolic rate (BMR). (Key: Biology Q26 = D.)

Question 27 Biology

All the hormones released by an anterior pituitary are tropic hormones except:

- A. TSH
- B. STH ✓ **Correct answer**
- C. ACTH
- D. Gonadotrophin hormone

A. thyroid-stimulating hormone is tropic (acts on the thyroid gland).

B. somatotropin (growth hormone) acts directly on body tissues (bone, muscle), not on

ocrine gland, so it is NOT tropic.

C. adrenocorticotropic hormone is tropic (acts on the adrenal cortex).

D. FSH/LH are tropic (act on the gonads). (Key: Biology Q27 = B.)

Question 28 Biology

W.O.F is endocrine as well as exocrine:

- A. Liver
- B. Adrenals
- C. Thyroid
- D. Pancreas ✓ **Correct answer**

A. exocrine (bile via ducts) but not endocrine.

B. endocrine only.

C. endocrine only.

D. both: endocrine (islets of Langerhans — insulin and glucagon, into the blood) and exocrine (pancreatic juice via ducts into the duodenum). (Key: Biology Q28 = D.)

Question 29 Biology

Ovulation is suppressed by progestrone via:

- A. Only by inhibition of LH ✓ **Correct answer**
- B. Inhibition of FSH & stimulation of LH
- C. Inhibition of LH & stimultion of FSH
- D. Inhibition of both FSH & LH

A. progesterone suppresses ovulation by inhibiting the mid-cycle LH surge (the LH peak that triggers ovulation); this is the mechanism the FSc text names.

B. progesterone does not stimulate LH; it suppresses the LH surge.

one inhibits LH, but it does not stimulate FSH.

D. progesterone does suppress both gonadotropins overall, but the ovulation-blocking mechanism is specifically the inhibition of the LH surge, which is the answer the paper asks for. (Key: Biology Q29 = A. "progestrone" and "stimultion" are filed as printed — misprints for "progesterone" and "stimulation".)

Question 30 Biology

The antibody molecule consists of _____ polypeptide chains:

- A. Eight
- B. Four ✓ **Correct answer**
- C. Six
- D. Two

A. no antibody has eight chains.

B. an antibody (IgG) molecule has four polypeptide chains: two identical heavy chains and two identical light chains, held by disulphide bonds.

C. no antibody has six chains.

D. two is the number of heavy (or light) chains only, not the whole molecule. (Key: Biology Q30 = B.)

Question 31 Biology

_____ cells survive for a few days and secrete a huge no of antibodies in blood, tissue fluids or lymph:

- A. Memory cells
- B. B-lymphocytes
- C. T-lymphocytes
- D. Plasma cells ✓ **Correct answer**

ells are long-lived and do not secrete antibodies in large amounts.

B. B-lymphocytes differentiate into plasma cells; they are not themselves the antibody-secreting factories.

C. T-cells mediate cell-mediated immunity, they do not secrete antibodies.

D. plasma cells are short-lived (a few days) effector cells that secrete huge numbers of antibodies into blood, tissue fluid and lymph. (Key: Biology Q31 = D.)

Question 32 Biology

The intermediate protection from infection of snake bite can be obtained by:

- A. Active Immunity
- B. Natural active immunity
- C. Passive immunity ✓ **Correct answer**
- D. Vaccination

A. active immunity takes days to develop and cannot give immediate protection against a snake bite.

B. immunity after recovering from an infection; not applicable to a snake bite.

C. antivenom serum (preformed antibodies) gives immediate, intermediate protection after a snake bite — the classic example of artificial passive immunity.

D. vaccination is active immunisation and is too slow for a snake bite. (Key: Biology Q32 = C.)

Question 33 Biology

Chlorophyll molecule contains:

- A. Mg^{2+} ✓ **Correct answer**
- B. Ca++

- D. Na+

A. the chlorophyll molecule has a magnesium ion (Mg2+) at the centre of its porphyrin ring.

B. calcium is not in chlorophyll.

C. potassium is not in chlorophyll.

D. sodium is not in chlorophyll. (Key: Biology Q33 = A. Filed "Mg++" as printed; the corrected form is "Mg^{2+}".)

Note: Filed option A read "Mg++" (misprint in the source reproduction); corrected to "Mg^{2+}" as documented in the reviewed file.

Question 34 Biology

The tail of chlorophyll molecule is embedded in:

- A. Membrane of mitochondria
- B. Thylakoid membrane ✓ **Correct answer**
- C. Membrane of S.E.R
- D. Membrane of R.E.R

A. chlorophyll is not in mitochondria.

B. the hydrophobic phytol tail of chlorophyll anchors the molecule in the thylakoid membrane of the chloroplast.

C. smooth endoplasmic reticulum has no chlorophyll.

D. rough endoplasmic reticulum has no chlorophyll. (Key: Biology Q34 = B.)

35 Biology

Carotenoids absorb light of:

- A. Yellow-orange range
- B. Yellow-red range
- C. Orange-red range
- D. Blue-violet range ✓ **Correct answer**

A. carotenoids reflect yellow-orange light (that is their colour), they do not absorb it.

B. carotenoids reflect yellow-red light.

C. carotenoids reflect orange-red light.

D. carotenoids absorb mainly blue-violet light (about 400–500 nm) and pass the absorbed energy to chlorophyll. (Key: Biology Q35 = D.)

Question 36 Biology

Chlorophyll 'a' and chlorophyll 'b' differ in one of the functional groups... Chlorophyll 'a' has:

- A. -CHO
- B. -OH
- C. -CH3 ✓ **Correct answer**
- D. -NH2

A. the aldehyde group (-CHO) is what chlorophyll 'b' has in place of the methyl group; chlorophyll 'a' does not have it.

B. neither chlorophyll 'a' nor 'b' differs by a hydroxyl group.

C. chlorophyll 'a' has a methyl group (-CH3) at the position where chlorophyll 'b' has -CHO; that single group is the difference between them.

D. neither chlorophyll has an amino group. (Key: Biology Q36 = C.)

37 Biology

Glycerate-3-phosphate in the presence of ATP and reduced NADP from light dependent stage is reduced to:

- A. 3- carbon compound ✓ **Correct answer**
- B. Ribulose bisphosphate
- C. 5-carbon compound
- D. 6-carbon compound

A. 3-phosphoglycerate (3-PGA) is reduced by ATP and NADPH to glyceraldehyde-3-phosphate (G3P), a 3-carbon compound.

B. RuBP is the 5-carbon CO2 acceptor that is regenerated at the end of the Calvin cycle, not the reduction product of 3-PGA.

C. the reduction product is 3-carbon, not 5-carbon.

D. no 6-carbon compound is formed at this step. (Key: Biology Q37 = A.)

Question 38 Biology

Calvin cycle occurs in:

- A. Grana of chloroplast
- B. Stroma of chloroplast ✓ **Correct answer**
- C. Chlorophyll (Reaction centre)
- D. Roots of plants

A. the grana (thylakoids) host the light-dependent reactions, not the Calvin cycle.

B. the Calvin cycle (light-independent reactions) occurs in the stroma, where its enzymes are.

C. the reaction centre is part of the photosystems in the thylakoids, not the Calvin cycle's site.

not photosynthesise. (Key: Biology Q38 = B.)

Question 39 Biology

Restriction enzyme EcoR1 cuts DNA to produce:

- A. Blunt ends
- B. Non-palindromic ends
- C. Sticky ends ✓ **Correct answer**
- D. Split ends

A. EcoRI does not produce blunt ends (that is e.g. SmaI).

B. EcoRI recognises the palindromic sequence GAATTC.

C. EcoRI cuts GAATTC between G and A, leaving single-stranded overhangs (sticky/cohesive ends) that can base-pair with complementary ends.

D. not a term for restriction fragments. (Key: Biology Q39 = C.)

Question 40 Biology

Restriction endonucleases are produced by:

- A. Fungi
- B. Algae
- C. Bacteria ✓ **Correct answer**
- D. Viruses

A. fungi do not produce restriction endonucleases.

B. algae do not produce restriction endonucleases.

C. bacteria produce restriction endonucleases as a defence that cuts invading viral (phage) DNA.

D. viruses are the targets of restriction enzymes, not their producers. (Key: Biology Q40 =

Question 41 Biology

DNA segments of different lengths can be separated by a process of:

- A. Western blotting
- B. Northern blotting
- C. Autoradiography
- D. Gel electrophoresis ✓ **Correct answer**

A. separates and detects PROTEINS, not DNA segments.

B. detects RNA, not DNA segments.

C. visualises labelled molecules on film; it does not separate DNA by length.

D. DNA fragments migrate through a gel under an electric field and separate by length (shorter fragments move faster). (Key: Biology Q41 = D.)

Question 42 Biology

The is the 1st heat stable component used in PCR:

- A. Taq-isomerase
- B. Taq-helicase
- C. Taq-polymerase ✓ **Correct answer**
- D. Taq SSBp

A. there is no such PCR component.

B. helicase unwinds DNA in cells, but PCR uses heat (not helicase) to denature DNA.

C. Taq DNA polymerase (from the thermophilic bacterium Thermus aquaticus) is the heat-stable enzyme used in PCR; it survives the denaturation temperature and extends the primers.

and binding protein is not the heat-stable PCR enzyme. (Key: Biology Q42 = C. The stem prints "The is the 1st heat stable component used in PCR:" — a word is missing (filed as printed); the options make the intended question unambiguous.)

Question 43 Biology

Patients of cystic fibrosis (CF) produse thick mucus because of faulty:

- A. Trans-membrane carrier ✓ **Correct answer**
- B. Cl- ions
- C. Na+ ions
- D. Mucus membrane

A. cystic fibrosis is caused by a faulty CFTR protein, a transmembrane chloride channel/carrier; without working CFTR, chloride (and so water) does not reach the mucus, which becomes thick and sticky.

B. chloride ions themselves are not faulty; it is their transport that fails.

C. sodium transport is affected secondarily, not the primary fault.

D. the mucus is the result, not the faulty component. (Key: Biology Q43 = A. "produse" is filed as printed — a misprint for "produce".)

Question 44 Biology

Chemicals used for destroying agricultural competitors are known as:

- A. Antibiotics
- B. Pesticides ✓ **Correct answer**
- C. Disinfectants
- D. Chemotherapeutic agents

A. kill bacteria (used in medicine), not agricultural competitors.

B. chemicals used to destroy agricultural pests/competitors (insects, weeds, fungi) that

C. kill microbes on surfaces, not agricultural competitors.

D. drugs used to treat disease (e.g. cancer), not agricultural competitors. (Key: Biology Q44 = B.)

Note: Filed option D read "Chemotherpeutic agents" (misprint in the source reproduction); corrected to "Chemotherapeutic agents" as documented in the reviewed file.

Question 45 Biology

How denitrification does occur in soils:

- A. Bacterial reduction of NO_3^- ions to N_2 gas ✓ **Correct answer**
- B. Active uptake of Nitrate ions by plant roots
- C. Drainage of manure from fields
- D. Leaching of nitrate ions

A. denitrification is the bacterial reduction of nitrate (NO3−) to nitrogen gas (N2), which escapes to the atmosphere.

B. that is nitrogen assimilation by plants, not denitrification.

C. that removes nitrogen physically, it is not denitrification.

D. leaching washes nitrate down through the soil; it does not convert it to N2. (Key: Biology Q45 = A. Filed "NO3-" as printed; the corrected form is "$NO3^-$ … N_2".)

Note: Filed option A read "Bacterial reduction of NO3- ions to N2 gas" (misprint in the source reproduction); corrected to "Bacterial reduction of NO_3^- ions to N_2 gas" as documented in the reviewed file.

46 Biology

Process by which unrelated species evolve to functionally resemble each other is called:

- A. Convergent evolution ✓ **Correct answer**
- B. Divergent evolution
- C. Co-evolution
- D. Parallel evolution

A. unrelated species independently evolve similar features because they face similar environments (e.g. wings in birds and bats).

B. related species evolve apart (different features from a common ancestor).

C. two interacting species evolve together (e.g. predator and prey).

D. related species evolve similar features independently (similar to convergent, but from a common ancestor). (Key: Biology Q46 = A.)

Question 47 Biology

W.O.F shows evidences from evolution through molecular biology:

- A. Development of bronchial arches in vertebrate embryo
- B. Distribution of species
- C. Comparison of genes and proteins in different species ✓ **Correct answer**
- D. Study of vestigial organs

A. embryological evidence, not molecular biology.

B. biogeographical evidence, not molecular biology.

C. comparing DNA and protein sequences across species is the molecular-biology evidence for evolution (the more similar the sequences, the closer the relationship).

D. anatomical evidence, not molecular biology. (Key: Biology Q47 = C. "Comparision" and "verterbrate" are filed as printed — misprints for "Comparison" and "vertebrate".)

option A read "Development of bronchial arches in verterbrate embryo" (misprint in the source reproduction); corrected to "Development of bronchial arches in vertebrate embryo" as documented in the reviewed file. Filed option C read "Comparision of genes and proteins in different species" (misprint in the source reproduction); corrected to "Comparison of genes and proteins in different species" as documented in the reviewed file.

Question 48 Biology

Large population size, random mating, no mutation and no emigration or immigration are the postulates of:

- A. Hardy-Weinberg theorem ✓ **Correct answer**
- B. Mendel's law of independent assortment
- C. Mendel's law of segregation
- D. Theory presented by Schleiden and Schwann

A. the Hardy-Weinberg equilibrium holds when the population is large, mating is random, and there is no mutation, migration or selection.

B. about alleles of different genes assorting independently, not population conditions.

C. about the two alleles of a gene separating in gametes, not population conditions.

D. the cell theory (Schleiden and Schwann), unrelated to population genetics ("Schleien" filed as printed — a misprint for "Schleiden"). (Key: Biology Q48 = A.)

Note: Filed option D read "Theory presented by Schleien and Schwann" (misprint in the source reproduction); corrected to "Theory presented by Schleiden and Schwann" as documented in the reviewed file.

Question 49 Biology

Pure breeding lines of pea were taken regarding seed shape — Round and wrinkled and were crossed with no intermediate between parents. All offsprings were found to be

e results show:

- A. Co-dominance
- B. Dominance-recessive relationship ✓ **Correct answer**
- C. Incomplete dominance
- D. Over dominance relationship

A. co-dominance shows BOTH parental traits in the heterozygote, not one trait only.

B. all F1 offspring are round (the dominant trait) with no intermediates, so round is dominant over wrinkled (recessive).

C. incomplete dominance gives an INTERMEDIATE phenotype, but here there was no intermediate.

D. over-dominance gives a heterozygote more extreme than either parent, not seen here. (Key: Biology Q49 = B.)

Question 50 Biology

Base substitution, deletion and insertion are examples of:

- A. Chromosomal aberration
- B. Point mutation ✓ **Correct answer**
- C. Aneuploidy
- D. Euploidy

A. large-scale changes to chromosome structure/number, not single-base changes.

B. substitution, deletion and insertion of one (or a few) bases are point (gene) mutations.

C. an abnormal NUMBER of chromosomes (e.g. trisomy).

D. a complete extra SET of chromosomes (e.g. polyploidy). (Key: Biology Q50 = B.)

51 Biology

The condition in which the heterozygote has a phenotype intermediate between contrasting homozygous parents is called as:

- A. Dominance
- B. Incomplete dominance ✓ **Correct answer**
- C. Co-dominance
- D. Over- dominance

A. dominance gives the heterozygote the dominant parent's phenotype, not an intermediate.

B. the heterozygote shows a phenotype intermediate between the two homozygous parents (e.g. pink flowers from red × white).

C. the heterozygote shows BOTH parental phenotypes, not an intermediate.

D. the heterozygote is more extreme than either parent. (Key: Biology Q51 = D — WRONG. The printed key is corrected D→B; an intermediate heterozygote phenotype is the definition of incomplete dominance, not over-dominance.)

Question 52 Biology

The interaction between different genes occupying different loci is:

- A. Dominance
- B. Co-dominance
- C. Pleiotropy
- D. Epistasis ✓ **Correct answer**

A. dominance is the interaction between two alleles of the SAME gene, not different genes.

B. co-dominance is also between alleles of the same gene (both expressed).

affecting several traits, not an interaction between different genes.

D. epistasis is the interaction between genes at DIFFERENT loci, where one gene masks or modifies the effect of another. (Key: Biology Q52 = D.)

Question 53 Biology

Locus stands for:

- A. Position of gene on homologous chromosome
- B. Regions of chromosomes
- C. Position of an allele within a DNA molecule ✓ **Correct answer**
- D. Close regions of same chromosome

A. also a correct description of a locus (a gene occupies the same locus on both homologous chromosomes), so this option is defensible too.

B. too vague; a locus is a specific position, not a region.

C. a locus is the specific position that a gene (and its alleles) occupies on the DNA molecule (chromosome); this is the answer the official key gives.

D. that describes linked genes, not a locus. (Key: Biology Q53 = C. PICK-ONE: A is also a correct definition of a locus, so the question has two defensible answers; C is taken as keyed.)

Question 54 Biology

Self fertilization of F-1 dihybrids, following independent assortment of alleles result in:

- A. 3/16 Tall-round ; 3/16 dwarf-wrinkled
- B. 9/16 Tall-wrinkled ; 3/16 dwarf-round
- C. 9/16 Tall-round ; 3/16 Dwarf-round
- D. 3/16 Tall-wrinkled ; 3/16 Dwarf-round ✓ **Correct answer**

A. wrong on both counts: tall-round is 9/16 and dwarf-wrinkled is 1/16.

ed is 3/16, not 9/16 (dwarf-round is correctly 3/16).

C. both numbers are correct (tall-round 9/16, dwarf-round 3/16 in the 9:3:3:1 ratio), so this option is also correct.

D. both numbers are correct (the two 3/16 classes of the 9:3:3:1 dihybrid ratio); this is the answer the official key gives. (Key: Biology Q54 = D. PICK-ONE: C states two correct ratios as well, so the question has two defensible answers; D is taken as keyed.)

Question 55 Biology

As a result of cross-fertilization of a true breeding pea plant having purple coloured flowers with that of white coloured flowers, the offsprings will have flowers with:

- A. 1/4 purple ; 3/4 white
- B. 1/4 white ; 3/4 purple
- C. All white
- D. All purple ✓ **Correct answer**

A. that would be an F2 ratio, not the F1 of a true-breeding cross.

B. also an F2-type ratio, not the F1.

C. white is recessive; it cannot appear in the F1.

D. purple (P) is dominant over white (p); PP × pp gives all Pp offspring, all purple. (Key: Biology Q55 = D.)

Question 56 Biology

The gene for red-green colour blindness is present on:

- A. Y-chromosome
- B. X-chromosome ✓ **Correct answer**
- C. Autosome 7
- D. Autosome 9

colour blindness is not Y-linked (it affects males more because they have only one X).

B. red-green colour blindness is an X-linked recessive trait; its gene is on the X chromosome.

C. not the location of the colour-blindness gene.

D. not the location of the colour-blindness gene. (Key: Biology Q56 = B.)

Question 57 Biology

W.O.F structures is present in both plant and animal cells but is absent in prokaryotic cells:

- A. Centrioles
- B. Microtubule ✓ **Correct answer**
- C. Plastids
- D. Sieve-tubes

A. centrioles are absent in most higher plant cells, so they are not present in both plant and animal cells.

B. microtubules (part of the cytoskeleton) occur in both plant and animal cells, and prokaryotes have no microtubules.

C. plastids (chloroplasts etc.) are plant-only.

D. sieve tubes are plant-only (phloem). (Key: Biology Q57 = B.)

Question 58 Biology

Cilia and flagella are absent in:

- A. Viruses ✓ **Correct answer**
- B. Bacteria

- D. Lower animals

A. viruses are non-cellular and have no cilia or flagella; this is the answer the official key gives.

B. bacteria DO have flagella (bacterial flagella), so they are not the answer.

C. higher plants also lack cilia and flagella (their gametes are non-motile), so this option is also correct.

D. lower animals have cilia and flagella (e.g. Paramecium, sponges). (Key: Biology Q58 = A. PICK-ONE: C is also correct — higher plants lack cilia and flagella too; A is taken as keyed.)

Question 59 Biology

DNA molecule in prokaryotes is:

- A. Single, circular, double stranded molecule not bound by membrane ✓ **Correct answer**
- B. Double, circular molecule
- C. Linear double stranded molecule
- D. Single, circular, double stranded, membrane bound

A. prokaryotic DNA is a single circular double-stranded molecule lying free in the cytoplasm (nucleoid), not enclosed by a membrane.

B. there is only one (single) chromosome, not two.

C. prokaryotic chromosomes are circular, not linear.

D. the prokaryotic chromosome is NOT membrane-bound (that is the point of the nucleoid). (Key: Biology Q59 = A.)

60 Biology

Nucleoid is a structure not found in:

- A. Campylobacter
- B. Cyanobacteria
- C. Spirochete
- D. Goblet cells ✓ **Correct answer**

A. a bacterium; it has a nucleoid.

B. bacteria; they have nucleoids.

C. a bacterium; it has a nucleoid.

D. goblet cells are eukaryotic (animal) mucus-secreting cells with a true membrane-bound nucleus, so they have no nucleoid. (Key: Biology Q60 = D.)

Question 61 Biology

Cell wall structure of a cell of unknown origin was studied and was found to contain polysaccharide chain linked with short chains of amino acid.. What do u think it can be??

- A. Bacteria ✓ **Correct answer**
- B. Fungi Cell
- C. Algae
- D. Cortex cells

A. a wall of polysaccharide chains cross-linked with short amino-acid chains is peptidoglycan (murein), the bacterial cell wall.

B. fungal walls are chitin (a polysaccharide with no amino-acid chains).

C. algal walls are cellulose (a pure polysaccharide, no amino-acid chains).

D. plant cortex cells have cellulose walls (no amino-acid chains). (Key: Biology Q61 = A.)

62 Biology

Ribosomes present in prokaryotes are:

- A. 80S
- B. 60S
- C. 50S
- D. 70S ✓ **Correct answer**

A. 80S ribosomes are eukaryotic, not prokaryotic.

B. 60S is the large subunit of the eukaryotic (80S) ribosome.

C. 50S is the large subunit of the prokaryotic ribosome, not the whole ribosome.

D. prokaryotic ribosomes are 70S (50S + 30S subunits). (Key: Biology Q62 = D.)

Question 63 Biology

Functionally mesosomes can be compared with:

- A. Ribosomes
- B. Mitochondria ✓ **Correct answer**
- C. Polysomes
- D. Golgi bodies

A. ribosomes make proteins; mesosomes do not.

B. mesosomes are infoldings of the bacterial plasma membrane that carry respiratory enzymes and make ATP, so functionally they are the bacterial equivalent of mitochondria.

C. polysomes are groups of ribosomes on one mRNA; mesosomes are not.

D. Golgi bodies process and package proteins; mesosomes do not. (Key: Biology Q63 = B.)

64 Biology

Students were asked to give a guess about a unicellular organism with darkly stained nucleus.. W.O.F can be straight away excluded from the list:

- A. Paramecium
- B. Amoeba
- C. Plasmodium
- D. Lactobacillus ✓ **Correct answer**

A. a eukaryote with a (darkly staining) nucleus; cannot be excluded.

B. a eukaryote with a nucleus; cannot be excluded.

C. a eukaryote with a nucleus; cannot be excluded.

D. a bacterium (prokaryote) with no true nucleus, so it can be excluded straight away from a list of organisms with a darkly stained nucleus. (Key: Biology Q64 = D.)

Question 65 Biology

Binary fission is a characteristic cell division NOT found in:

- A. Pseudomonas
- B. Campylobacter
- C. Euglena ✓ **Correct answer**
- D. E.coli

A. a bacterium; it divides by binary fission.

B. a bacterium; it divides by binary fission.

C. a eukaryote (flagellate protozoan); it divides by mitosis, not binary fission.

D. a bacterium; it divides by binary fission. (Key: Biology Q65 = C.)

66 Biology

_____ are the specific structures related to monosaccharides:

- A. Glycosidic bond
- B. Keto group ✓ **Correct answer**
- C. Maltose
- D. Fructose

A. a glycosidic bond LINKS monosaccharides into disaccharides/polysaccharides; it is not a structure of a monosaccharide itself.

B. monosaccharides are classified by their functional group into aldoses (aldehyde group) and ketoses (keto group); the keto group is the defining structure of ketose monosaccharides such as fructose.

C. maltose is a DISACCHARIDE (two glucoses), not a monosaccharide structure.

D. fructose is an example of a (ketose) monosaccharide, not a "structure related to" monosaccharides. (Key: Biology Q66 = B.)

Question 67 Biology

_____ are the major site for storage of glycogen in animal's body:

- A. Muscle and liver ✓ **Correct answer**
- B. Around thighs and belly
- C. Around belly and hips
- D. Liver and kidneys

A. the liver and skeletal muscle are the two major glycogen stores in the body (liver glycogen for blood glucose, muscle glycogen for local use).

B. fat, not glycogen, is stored around thighs and belly.

C. fat, not glycogen, is stored around belly and hips.

ys do not store glycogen in quantity. (Key: Biology Q67 = A.)

Question 68 Biology

The number of amina acids that have been found to occur in cells and tissues are:

- A. 170 ✓ **Correct answer**
- B. 20
- C. 25
- D. 45

A. more than 170 amino acids have been found to occur in cells and tissues (only 20 of them are used to build proteins); this is the number the FSc text gives. (The stem prints "amina acids" — a misprint for "amino acids", filed as printed.)

B. 20 is the number of amino acids used in protein synthesis, not the number found in cells and tissues.

C. not the number found in cells and tissues.

D. not the number found in cells and tissues. (Key: Biology Q68 = A.)

Question 69 Biology

Most proteins are made up of _____ type of amino acids:

- A. 20 ✓ **Correct answer**
- B. 170
- C. 25
- D. 200

A. proteins are built from 20 standard amino acids (the protein amino acids).

B. 170 is the number of amino acids found in cells and tissues, not the number used to make proteins.

n is made of 25 amino-acid types.

D. no protein is made of 200 amino-acid types. (Key: Biology Q69 = C — WRONG. The printed key is corrected C→A; proteins are made of the 20 standard amino acids.)

Question 70 Biology

If in lipids there is an higher proportion of unsaturated fatty acids then it will be:

- A. Oils ✓ **Correct answer**
- B. Waxes
- C. Phenols
- D. Fats

A. lipids rich in unsaturated fatty acids are liquid at room temperature, i.e. oils.

B. waxes are solid esters of long-chain alcohols and fatty acids, not defined by unsaturation.

C. phenols are aromatic compounds, not lipids.

D. fats are lipids rich in SATURATED fatty acids and are solid at room temperature. (Key: Biology Q70 = A.)

Question 71 Biology

When X-rays are passed through crystalline DNA, it shows helix making one twist every:

- A. 2nm
- B. 3.4nm ✓ **Correct answer**
- C. 34nm
- D. 4nm

A. 2 nm is the DIAMETER of the DNA double helix, not the length of one twist.

B. one full turn (twist) of the DNA helix is 3.4 nm long (10 base pairs × 0.34 nm per pair);

tch shown by X-ray diffraction.

C. 34 nm is ten turns, not one.

D. not the pitch of the DNA helix. (Key: Biology Q71 = B.)

Question 72 Biology

Following is the structure of:

- A. Uracil
- B. Thymine
- C. Guanine
- D. Cytosine ✓ **Correct answer**

A. uracil is a pyrimidine with two carbonyls and no amino group; the diagram has an -NH2 group, so it is not uracil.

B. thymine (5-methyluracil) has a methyl group and two carbonyls and no -NH2 group; the diagram has an -NH2 group and only one carbonyl, so it is not thymine.

C. guanine is a PURINE (two fused rings); the diagram is a single six-membered pyrimidine ring.

D. the diagram (verified at 300 dpi) is a single pyrimidine ring bearing an exocyclic amino group (-NH2) and one carbonyl (=O): that is cytosine. (Key: Biology Q72 = D. The paper prints the structure diagram with the question; the diagram is described here — a six-membered pyrimidine ring with an -NH2 group and a C=O.)

Question 73 Biology

All enzymes are _____:

- A. Fibrous proteins
- B. Low molecular weight proteins
- C. Lipoproteins

bular proteins ✓ **Correct answer**

A. fibrous proteins (keratin, collagen) are structural, not enzymes.

B. enzymes vary in size and are not defined by low molecular weight.

C. lipoproteins are lipid-protein complexes, not enzymes.

D. all enzymes are globular proteins (their folded, roughly spherical shape forms the active site). (Key: Biology Q73 = D.)

Question 74 Biology

The reactants on which enzyme works are:

- A. Products
- B. Metabolites
- C. Substrates ✓ **Correct answer**
- D. Catabolites

A. products are what the enzyme PRODUCES, not what it works on.

B. metabolites are the substances involved in metabolism generally, not the specific reactant of an enzyme.

C. the reactants an enzyme acts on are called substrates (they bind the active site).

D. catabolites are the breakdown products of catabolism, not the enzyme's reactants. (Key: Biology Q74 = C.)

Question 75 Biology

W.O.F comprises of inorganic ions:

- A. Coenzymes
- B. Activators ✓ **Correct answer**
- C. Prosthetic group

A. coenzymes are ORGANIC non-protein molecules (e.g. NAD, FAD), not inorganic ions.

B. activators are inorganic ions (e.g. Mg2+, Zn2+, Cl−) that activate an enzyme.

C. a prosthetic group is a non-protein part tightly bound to the enzyme (often organic).

D. the apoenzyme is the protein part of the enzyme, not an inorganic ion. (Key: Biology Q75 = B.)

Question 76 Biology

W.O.F is a non-cellular infecious entity:

- A. Mycoplasma
- B. Escherichia coli
- C. Herpes virus ✓ **Correct answer**
- D. Diplococcus

A. a bacterium (cellular, though wall-less).

B. a bacterium (cellular).

C. a virus is a non-cellular infectious entity (nucleic acid + protein coat, no cell). (The stem prints "infecious" — a misprint for "infectious", filed as printed.)

D. a bacterium (cellular). (Key: Biology Q76 = C.)

Question 77 Biology

The viruses can reproduce:

- A. Without invading any cell
- B. In bacterial cell ✓ **Correct answer**
- C. By mitosis
- D. By meiosis

cannot reproduce outside a host cell; they have no machinery of their own.

B. viruses (bacteriophages) reproduce inside a bacterial host cell, using its machinery.

C. viruses do not divide by mitosis (they are not cells).

D. viruses do not divide by meiosis. (Key: Biology Q77 = B.)

Question 78 Biology

The life cycle in which the phage kills the bacteria is known as:

- A. Transduction
- B. Temperate phage cycle
- C. Lytic cycle ✓ **Correct answer**
- D. Lysogenic phage cycle

A. transfer of bacterial genes by a phage, not the killing cycle.

B. temperate phages can enter lysogeny (not killing the host).

C. in the lytic cycle the phage replicates inside the bacterium and then lyses (kills) it to release new phages.

D. in lysogeny the phage DNA integrates and the host survives and divides. (Key: Biology Q78 = C.)

Question 79 Biology

In W.O.F shapes, gut living symbiont Escherichia coli is found:

- A. Round
- B. Oval
- C. Spiral
- D. Rod ✓ **Correct answer**

A. round bacteria are cocci; E. coli is not a coccus.

ot oval.

C. spiral bacteria are spirilla/spirochaetes; E. coli is not spiral.

D. Escherichia coli is a rod-shaped bacterium (bacillus) living symbiotically in the gut. (Key: Biology Q79 = D.)

Question 80 Biology

Chitin, a chemical found in exoskeleton of arthropods is also found in cell wall of:

- A. Bacteria
- B. Fungi ✓ **Correct answer**
- C. Cyanobacteria
- D. Algae

A. bacterial walls are peptidoglycan, not chitin.

B. fungal cell walls are made of chitin (the same polysaccharide as arthropod exoskeletons).

C. cyanobacterial walls are peptidoglycan, not chitin.

D. algal walls are cellulose, not chitin. (Key: Biology Q80 = B.)

Question 81 Biology

Snails are the intermediate hosts in:

- A. Fasciola hepatica ✓ **Correct answer**
- B. Taenia solium
- C. Schistoma
- D. Ancyclosoma duodenale

A. the liver fluke's intermediate host is a freshwater snail (Lymnaea); this is the answer the official key gives.

apeworm's intermediate host is the pig, not a snail.

C. the blood fluke Schistosoma ALSO uses a snail as its intermediate host, so this option is also correct.

D. the hookworm has no intermediate host (direct life cycle). (Key: Biology Q81 = A. PICK-ONE: C is also correct — Schistosoma's intermediate host is likewise a snail; A is taken as keyed.)

Question 82 Biology

_____ is an intestinal parasite of man belonging to phylum nematoda:

- A. Taenia solium
- B. Wuchereria bancrofti
- C. Ascaris lumbricoides ✓ **Correct answer**
- D. Schistosoma

A. a tapeworm (cestode, phylum Platyhelminthes), not a nematode.

B. Wuchereria bancrofti is a nematode, but it is a lymphatic (tissue) parasite, not an intestinal one.

C. Ascaris lumbricoides is an intestinal roundworm (nematode) parasite of man.

D. Schistosoma is a blood fluke (trematode, Platyhelminthes), not a nematode. (Key: Biology Q82 = C. "Ascaria lumbricoides", "Wucheronia bancrolti" and "Schistoma" are filed as printed — misprints for "Ascaris lumbricoides", "Wuchereria bancrofti" and "Schistosoma".)

Note: Filed option B read "Wucheronia bancrolti" (misprint in the source reproduction); corrected to "Wuchereria bancrofti" as documented in the reviewed file. Filed option C read "Ascaria lumbricoides" (misprint in the source reproduction); corrected to "Ascaris lumbricoides" as documented in the reviewed file. Filed option D read "Schistoma" (misprint in the source reproduction); corrected to "Schistosoma" as documented in the

Question 83 Biology

Food is diverted in the oesophagous by:

- A. Glottis
- B. Tongue
- C. Cheeks
- D. Epiglottis ✓ **Correct answer**

A. the glottis is the opening of the trachea; food is kept OUT of it, it does not divert food.

B. the tongue pushes food back, but it does not divert it into the oesophagus.

C. the cheeks hold food in the mouth, they do not divert it.

D. the epiglottis is the flap that closes over the glottis during swallowing, diverting food into the oesophagus (and away from the trachea). (Key: Biology Q83 = D.)

Question 84 Biology

Label 'a' in the following diagram:

- A. Cardiac sphincter
- B. Sinoatrial valve
- C. Stomach valve
- D. Pyloric sphincter ✓ **Correct answer**

A. the cardiac sphincter is at the oesophagus–stomach junction (top of the diagram); the label 'a' does not point there.

B. a heart valve, not a structure of the stomach.

C. not a named structure.

D. the label 'a' (verified at 300 dpi) points to the narrow junction at the stomach's exit into

…m, where the pyloric sphincter sits. (Key: Biology Q84 = D. The paper prints a diagram of the stomach — oesophagus at the top, stomach body, duodenum at the lower left — with 'a' marking the pyloric end.)

Question 85 Biology

Enzyme pepsin acts on:

- A. Protein — Polypeptides ✓ **Correct answer**
- B. Polypeptide — Dipeptides
- C. Fats — Fatty acids/ glycerol
- D. Protein — Amino Acids

A. pepsin (in the stomach) digests protein into polypeptides (peptones); this is the correct substrate–product pair.

B. polypeptides are broken to dipeptides by peptidases (erepsin) in the small intestine, not by pepsin.

C. fats are digested by lipase, not pepsin.

D. pepsin does not break protein all the way to amino acids; that is the final step of protein digestion (peptidases). (Key: Biology Q85 = A. The paper prints the options as a table (Options | Substrate | Products); the substrate–product pairs are filed here as "Substrate — Product".)

Question 86 Biology

Following is the structure of gastric glands in stomach wall where 'x' is:

- A. Mucosa
- B. Mucus cells
- C. Visceral fat cells
- D. Oxyntic cells ✓ **Correct answer**

sa is the stomach's lining layer, not a cell in the gland.

B. mucus cells line the neck of the gland; 'x' does not point to a neck cell.

C. fat cells are not part of a gastric gland.

D. the diagram (verified at 300 dpi) shows a U-shaped gastric gland with "Zymogen cells" labelled on one side and 'x' pointing to a large cell on the opposite side: that is an oxyntic (parietal) cell, which secretes HCl. (Key: Biology Q86 = D.)

Question 87 Biology

Label the part 'Y' in the following diagram:

- A. Pleura
- B. Diaphragm ✓ **Correct answer**
- C. Chest cavity
- D. Intercostal muscles

A. the pleura is the membrane around the lungs, not the structure 'Y' points to.

B. the diagram shows the rib cage and lungs, and 'Y' points to the dome-shaped muscle at the bottom of the chest: the diaphragm.

C. the chest cavity is the whole space, not the structure 'Y' points to.

D. the intercostal muscles lie between the ribs, not at the bottom of the chest ("Intercoastal" filed as printed — a misprint for "Intercostal"). (Key: Biology Q87 = B.)

Note: Filed option D read "Intercoastal muscles" (misprint in the source reproduction); corrected to "Intercostal muscles" as documented in the reviewed file.

Question 88 Biology

W.O.F is a respiratory disorder related to malnutrition:

- A. Cancer

- C. Emphysema
- D. Tuberculosis ✓ **Correct answer**

A. lung cancer is linked to smoking/carcinogens, not malnutrition.

B. asthma is an allergic/inflammatory airway disorder, not malnutrition-related.

C. emphysema is linked to smoking and loss of lung elasticity, not malnutrition.

D. tuberculosis is the respiratory disorder the FSc text links to malnutrition (poor nutrition lowers resistance and TB is common where nutrition is poor). (Key: Biology Q88 = D.)

Question 89 Physics

The quantities which can be measured accurately are:

- A. Base quantities
- B. Physical Quantities ✓ **Correct answer**
- C. Derived Quantities
- D. Supplementary quantities

A. base quantities are one TYPE of physical quantity, not the whole class that can be measured.

B. physical quantities are defined as the quantities that can be measured (length, mass, time, etc.).

C. derived quantities are one type of physical quantity, expressed in terms of base quantities.

D. supplementary quantities (radian, steradian) are a small class of physical quantities ("quntities" filed as printed — a misprint for "quantities"). (Key: Physics Q1 = B.)

Note: Filed option D read "Supplementary quntities" (misprint in the source reproduction); corrected to "Supplementary quantities" as documented in the reviewed file.

90 Physics

An observer notes reading of scale from different angles (parallax) while measuring the length of wire, what type of error is possible:

- A. Systematic error
- B. Zero error
- C. Precised error
- D. Random error ✓ **Correct answer**

A. a systematic error is a consistent bias in one direction (e.g. a faulty scale); parallax varies with the viewing angle, so it is not systematic.

B. zero error is a fixed offset when the instrument reads non-zero at zero; parallax is not a zero error.

C. not a named error type.

D. parallax error varies randomly (positive or negative) with the observer's viewing angle, so it is a random error. (Key: Physics Q2 = D.)

Question 91 Physics

The ratio of displacement along diameter of cirle and total distance along circle is:

- A. 1:π ✓ **Correct answer**
- B. π:1
- C. 2:π
- D. π:2

A. displacement along a diameter = 2r; total distance along the circle (circumference) = 2πr; ratio = 2r : 2πr = 1 : π.

B. the inverse ratio.

C. that would be the ratio of the diameter to the circumference only if the displacement

the distance ft, which it is not.

D. not the ratio. (Key: Physics Q3 = A. "cirle" is filed as printed — a misprint for "circle".)

Question 92 Physics

Arshad is driving down 7th street, he drives 150m in 18s.. Assume he doesnot speed up or slow down, what is his speed:

- A. 0.38 m/s
- B. 126 m/s
- C. 8.33 m/s ✓ **Correct answer**
- D. 58.33 m/s

A. far too slow (150/18 is not 0.38).

B. far too fast (that would be 150 × 18 / 21, not the speed).

C. speed = distance/time = 150 m / 18 s = 8.33 m/s.

D. far too fast. (Key: Physics Q4 = C.)

Question 93 Physics

The distance travelled by a moving car with velocity 15 m/s in 2s, decelerates at 2m/s is equal to:

- A. 30m
- B. 34m
- C. 16m
- D. 26m ✓ **Correct answer**

A. that is the distance with NO deceleration (15 × 2 = 30 m).

B. that would be the distance with acceleration, not deceleration.

C. not the result of the equation.

$at = 15\times2 + \tfrac{1}{2}(-2)\times2^2 = 30 - 4 = 26$ m. (Key: Physics Q5 = D.)

Question 94 Physics

Total work done in figure is:

- A. 24 Nm
- B. 16 Nm
- C. 8 Nm
- D. Zero Nm ✓ **Correct answer**

A. not the work for this closed loop.

B. not the work for this closed loop.

C. not the work for this closed loop.

D. the figure (a closed F–d loop, force 2–6 N against displacement 2–6 m, traversed and returning to its start) is a complete cycle; the work done by a conservative force over a closed path is zero, so the net work done over the cycle is zero. (Key: Physics Q6 = D. The paper prints a hand-drawn F–d loop diagram with the question; the diagram is described here — force (N) on the vertical axis, displacement (m) on the horizontal, a closed elliptical loop with arrows.)

Question 95 Physics

Work done will be zero if angle between force and displacement is:

- A. 0°
- B. 60°
- C. 270° ✓ **Correct answer**
- D. 360°

A. cos 0° = 1, so work is maximum, not zero.

B. cos 60° = 0.5, so work is half the maximum.

cos 0 and cos 270° = 0, so the work done is zero.

D. cos 360° = 1, so work is maximum, not zero. (Key: Physics Q7 = C.)

Question 96 Physics

If mass 'm' is dropped from height 'h' vertically, 'f' is the force of friction during downward motion and 'v' is the velocity at bottom, following will hold:

- A. ½mv² = mgh + fh
- B. mgh = ½mv² − fh
- C. fh = mgh+ ½mv²
- D. mgh = ½mv² + fh ✓ **Correct answer**

A. wrong: the kinetic energy cannot exceed the potential energy lost.

B. wrong sign: friction REDUCES the kinetic energy, so fh is added to the KE to equal the PE lost.

C. wrong: the friction work cannot exceed the potential energy.

D. energy conservation: the potential energy lost (mgh) becomes kinetic energy (½mv²) plus the work done against friction (fh). (Key: Physics Q8 = D. Filed "½mv²" as printed; the corrected form is "½mv²" with the superscript 2.)

Question 97 Physics

A body moves in a circle with increasing angular velocity, at time 't'= 6s the angular velocity is 27rad/s... What is the radius of circle where linear velocity is 81cm/s:

- A. 6cm
- B. 9cm
- C. 7cm
- D. 3cm ✓ **Correct answer**

A. 6 cm would give v = 6 × 27 = 162 cm/s, not 81.

d give v = 9 × 27 = 243 cm/s.

C. 7 cm would give v = 7 × 27 = 189 cm/s.

D. v = rω, so r = v/ω = 81/27 = 3 cm (the time t = 6 s is a distractor; only the instantaneous ω and v matter). (Key: Physics Q9 = D.)

Question 98 Physics

A moon rotates about its axis. In future scientists may wish to put a satellite into an orbit around the moon such that the satellite remains stationary above one point on moon surface, the period of rotation of moon abou its axis is 27.4 days, what is the radius of required orbit? Mm= 7.35 x 10^{22}kg

- A. 3.59 x 10^{7} m
- B. 4.23 x 10^{7} m
- C. 8.86 x 10^{7} m ✓ **Correct answer**
- D. 6.96 x 10^{6} m

A. too small for a 27.4-day period.

B. too small for a 27.4-day period.

C. Kepler's third law: $r^3 = GMT^2/4\pi^2 = (6.67\times10^{-11} \times 7.35\times10^{22} \times (27.4\times86400)^2)/4\pi^2 = 6.96\times10^{23}$, so r = 8.86×10^{7} m.

D. far too small (that is the Moon's radius scale, not the orbit). (Key: Physics Q10 = C. "abou" is filed as printed — a misprint for "about".)

Question 99 Physics

In mass spring system mass 'm' is attached with spring of spring constant 'k' with time period 'T_1'.. Then the mass is replaced by '2m' with same spring, what is the time period 'T_2'

- A. $T_2 = T_1$

- C. $T_2 = \sqrt{2}\, T_1$ ✓ **Correct answer**
- D. $T_2 = T_1/\sqrt{2}$

A. the period depends on the mass, so it changes.

B. the period goes as the SQUARE ROOT of the mass, not linearly.

C. $T = 2\pi\sqrt{(m/k)}$, so doubling the mass multiplies the period by $\sqrt{2}$.

D. the period increases (not decreases) when the mass increases. (Key: Physics Q11 = C.)

Question 100 Physics

A body performing SHM with displacement $x=x_o \sin(wt+fi)$, when $t=0$, $x=x_o$.. Then what is the phase angle fi??

- A. π
- B. π/2 ✓ **Correct answer**
- C. π/4
- D. −π

A. $\sin \pi = 0$, which would give $x = 0$, not x_o.

B. at $t = 0$, $x = x_o \sin(\varphi) = x_o$, so $\sin \varphi = 1$ and $\varphi = \pi/2$.

C. $\sin(\pi/4) = 0.707$, which would give $x = 0.707x_o$, not x_o.

D. $\sin(-\pi) = 0$, which would give $x = 0$. (Key: Physics Q12 = B.)

Question 101 Physics

Angular displacement of a point moving in a circle 10cm when displacement of projection of this point along vertical diameter of circle is 8.66cm will be:

- A. 30°
- B. 45°

- D. 75°

A. the projection at 30° would be 10 sin 30° = 5 cm, not 8.66 cm.

B. the projection at 45° would be 10 sin 45° = 7.07 cm.

C. the projection of the point on the vertical diameter is r sin θ = 10 sin θ = 8.66 cm, so sin θ = 0.866 and θ = 60°.

D. the projection at 75° would be 10 sin 75° = 9.66 cm. (Key: Physics Q13 = C.)

Question 102 Physics

A wave travelling with speed of 130 m/s having wavelength of 5m. What is its frequency:

- A. 650 Hz
- B. 20 Hz
- C. 26 Hz ✓ **Correct answer**
- D. 3.8 x 10^2 Hz

A. that is v × λ (130 × 5), the wrong operation.

B. not the result of v/λ.

C. f = v/λ = 130/5 = 26 Hz.

D. not the result of v/λ. (Key: Physics Q14 = C.)

Question 103 Physics

A metallic wire of length 2m hooked between two points has tension 10N. If mass per unit length is 0.004 kg/m, their fundamental frequency emitted by wire on vibration is:

- A. 48 Hz
- B. 24 Hz
- C. 12.5 Hz ✓ **Correct answer**

A. not the result of the string formula.

B. close to twice the answer (that would be the second harmonic).

C. $f_1 = (1/2L)\sqrt{(T/\mu)} = (1/4)\sqrt{(10/0.004)} = (1/4)(50) = 12.5$ Hz.

D. half the fundamental (that would be the frequency for a wire twice as long). (Key: Physics Q15 = C.)

Question 104 Physics

Coherent lines emerge from two fine parallel slits 'A' and 'B' as shown in figure: If 'P' is the position of nth dark fringe from centre of interference, then phase difference between wave train 'A' and 'B' is:

- A. nπ radian
- B. 2πn radian
- C. (n+½)π radian
- D. (2n+1)π radian ✓ **Correct answer**

A. nπ gives bright fringes for even n and dark for odd n, not the dark-fringe condition in general.

B. 2πn is the phase difference for BRIGHT fringes (constructive interference).

C. (n+½)λ is the PATH difference for the nth dark fringe, not the phase difference; the phase difference is (2π/λ) times the path difference.

D. a dark fringe (destructive interference) needs a phase difference that is an odd multiple of π: (2n+1)π for n = 0, 1, 2, … (Key: Physics Q16 = C — WRONG. The printed key is corrected C→D; it confuses the path difference (n+½)λ with the phase difference (2n+1)π. The paper prints a figure of the two slits A and B and the screen with point P; the figure is described here.)

105 Physics

The wavelength of light which produces second order spectrum on diffraction grating on which 5000 lines/cm are ruled at an angle of 30° will be:

- A. 6×10^{-7} m
- B. 4×10^{-6} m
- C. 5×10^{-7} m ✓ **Correct answer**
- D. 3×10^{-6} m

A. not the result of the grating equation.

B. not the result (that is the grating spacing itself).

C. grating spacing d = 1/5000 cm = 2×10^{-6} m; d sin θ = nλ gives λ = (2×10^{-6} × sin 30°)/2 = (2×10^{-6} × 0.5)/2 = 5×10^{-7} m.

D. not the result of the grating equation. (Key: Physics Q17 = C.)

Question 106 Physics

Estimate pressure of air molecules at 273K, if mean square speed is 500 m^2/s^2 and density of air is 6 kg/m^3:

- A. 1×10^3 Pa ✓ **Correct answer**
- B. 2.5×10^2 Pa
- C. 1×10^2 Pa
- D. 2.7×10^3 Pa

A. kinetic theory: P = (1/3)ρ$<c^2>$ = (1/3)(6)(500) = 1000 Pa = 1×10^3 Pa.

B. not the result of (1/3)ρ$<c^2>$.

C. a factor of 10 too small.

D. not the result of (1/3)ρ$<c^2>$. (Key: Physics Q18 = A.)

107 Physics

1 mole of a gas occupies volume 1.00×10^{-2} m^3 in a gas cylinder whose pressure is equal to 2.50×10^5 Pa. The temperature of cylinder is:

- A. 227K
- B. 300K ✓ **Correct answer**
- C. 370K
- D. 390K

A. not the result of the gas law.

B. $T = PV/nR = (2.50\times10^5 \times 1.00\times10^{-2})/(1 \times 8.31) = 2500/8.31 = 300.8$ K ≈ 300 K.

C. not the result of the gas law.

D. not the result of the gas law. (Key: Physics Q19 = B.)

Question 108 Physics

The value of pressure and volume of fixed mass of gas in thermometer at triple point of water Pf= 1.00×10^5 Pa and Vf= 1×10^{-3} m^3. When P= 1.1×10^5 Pa and V= 1.2×10^{-3} m^3. Then temperature of gas is:

- A. 361K ✓ **Correct answer**
- B. 298K
- C. 273K
- D. 250K

A. for a constant-volume gas thermometer, $T = 273.16 \times (PV)/(P_f V_f) = 273.16 \times (1.1\times10^5 \times 1.2\times10^{-3})/(1.00\times10^5 \times 1\times10^{-3}) = 273.16 \times 1.32 = 360.6 \approx 361$ K.

B. not the result of the gas-thermometer relation.

C. that is the triple-point temperature itself, not the new temperature.

D. not the result of the gas-thermometer relation. (Key: Physics Q20 = A.)

109 Physics

A point charge at distance 'x' from another point charge experiences a force F of repulsion, which graph shows relationship of force F to 'x':

- A. F vs x^2 (straight line rising)
- B. F vs 1/x (straight line rising)
- C. F vs $1/x^2$ (straight line rising) ✓ **Correct answer**
- D. F vs x (straight line falling)

A. Coulomb's law gives $F \propto 1/x^2$, not $F \propto x^2$.

B. $F \propto 1/x^2$, so plotting F against 1/x gives a parabola, not a straight line.

C. $F = kq_1q_2/x^2$, so F plotted against $1/x^2$ is a straight line through the origin; this is the correct graph (verified at 300 dpi).

D. F against x is a hyperbola ($F \propto 1/x^2$), not a straight falling line. (Key: Physics Q21 = C. The paper prints four hand-drawn graphs labelled A–D; the options are the graphs themselves, described here as filed.)

Question 110 Physics

The Coulumbs force between two point charges q1=1C and q2 is 2N. Where distance between them is 3m, The charge q2 is:

- A. 1×10^{-9} C
- B. 1×10^{9} C
- C. 2×10^{9} C
- D. 4×10^{-9} C

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. this is the printed key, but it does not follow from the printed numbers.

C. far too large.

D. does not follow from the printed numbers. Coulomb's law with the printed numbers (F = 2 N, q_1 = 1 C, r = 3 m) gives $q_2 = Fr^2/kq_1 = (2 \times 9)/(9\times10^9 \times 1) = 2\times10^{-9}$ C, which is NOT among the options. No option follows from the stem as printed, so the question is excluded as defective. (Key: Physics Q22 = A — the key does not follow from the printed numbers; the stem's "2N" or "1C" is evidently misprinted, but the correction is not forced by any surviving context, so the item is excluded rather than guessed.)

Question 111 Physics

Electric field strength at position vector r=(4i + 3j)m caused by point charge q= 5uC placed at origin is:

- A. 1440i + 1080j V/m ✓ **Correct answer**
- B. 1240i + 1280j N/C
- C. 1440i+ 1080j N/m
- D. 1240i + 1080j N/C

A. r = $\sqrt{(4^2+3^2)}$ = 5 m; E = $kq/r^2 = (9\times10^9 \times 5\times10^{-6})/25$ = 1800 N/C, directed along $\hat{r}$ = (4i+3j)/5, so E = 1800×(4i+3j)/5 = 1440i + 1080j N/C, and N/C = V/m.

B. wrong components.

C. right numbers but the wrong unit (N/m is not a field unit).

D. wrong i-component. (Key: Physics Q23 = A.)

Question 112 Physics

2.00 x 106 e passing through a coductor in 1millisecond. Electric current through conductor is:

- A. 3.2 x 10^{-10} A ✓ **Correct answer**

- C. 320 x 10^{-10} A
- D. 0.320 x 10^{-10} A

A. charge Q = ne = $2\times10^{6} \times 1.6\times10^{-19} = 3.2\times10^{-13}$ C; I = Q/t = $3.2\times10^{-13}/10^{-3} = 3.2\times10^{-10}$ A.

B. a factor of 100 too large.

C. a factor of 100 too large.

D. a factor of 10 too small. (Key: Physics Q24 = A. "coductor" is filed as printed — a misprint for "conductor"; "2.00 x 106 e" is filed as printed — 2.00×10^{6} electrons.)

Question 113 Physics

A carbon resistor connected to a battery of 50V and 2A current is passing throug it. If voltage is increased to 75V then current will be:

- A. 1.5 A
- B. 3A ✓ **Correct answer**
- C. 4.5 A
- D. 6A

A. the current increases with voltage, it does not fall.

B. R = V/I = 50/2 = 25 Ω; at 75 V, I = 75/25 = 3 A.

C. not the result of Ohm's law.

D. not the result of Ohm's law. (Key: Physics Q25 = B.)

Question 114 Physics

Effective resistance between point A and B is:

- A. 40 Ohms
- B. 50 Ohms

- Ohms ✓ **Correct answer**
- D. 30 Ohms

A. that would be all four 10 Ω resistors in series, which they are not.

B. not the resistance of this network.

C. the circuit (verified from the figure) is a balanced Wheatstone bridge: four 10 Ω arms with a 10 Ω resistor across the middle; since 10/10 = 10/10 the bridge is balanced, no current flows through the middle resistor, and the resistance is (10+10) ‖ (10+10) = 20 ‖ 20 = 10 Ω.

D. not the resistance of this network. (Key: Physics Q26 = C. The paper prints a hand-drawn bridge diagram — A on the left, B on the right, 10 Ω on each of the four arms and 10 Ω across the middle; the diagram is described here.)

Question 115 Physics

Electric current is flowing through the circuit as shown in figure, what will be the direction of magnetic lines of force:

- A. Clockwise ✓ **Correct answer**
- B. Anticlockwise
- C. From top to bottom
- D. From bottom to top

A. the circuit (verified at 300 dpi) carries current clockwise around the loop (right along the top, down the right-hand conductor, left along the bottom), and by the right-hand rule the magnetic lines of force around the conductor run clockwise.

B. the current does not circulate anticlockwise.

C. the magnetic lines of force circle the conductor, they do not run straight from top to bottom.

etic lines of force circle the conductor, they do not run straight from bottom to top. (Key: Physics Q27 = A. The paper prints a hand-drawn rectangular circuit with a battery on the left and a vertical conductor on the right; the diagram is described here.)

Question 116 Physics

The magnetic flux linked with a solenoid of area 'A', having 'N' turns at right angle to magnetic field is:

- A. NBA ✓ **Correct answer**
- B. BA
- C. 1/2NBA
- D. BAcos(theeta)

A. the flux through one turn is BA (the field is normal to the area, so cos θ = 1); with N turns the total flux linkage is NBA.

B. that is the flux through ONE turn only.

C. there is no factor of 1/2 in the flux linkage.

D. that is the flux through one turn at an angle θ; with N turns at right angle (θ = 0) it is NBA, not BAcos θ. (Key: Physics Q28 = A.)

Question 117 Physics

A charge projected with velocity of 10m/s in a magnetic fiels of 10T at an angle of 60°, if force exerted on charge is 2.78 x 10−17 N, then value of charge is:

- A. 1.6 x 10^{-19} C
- B. 2.7 x 10^{-19} C
- C. 3.2 x 10^{-19} C ✓ **Correct answer**
- D. 4.8 x 10^{-19} C

A. that is the charge of one electron; the force here is twice as large.

sult of F = qvB sin θ.

C. F = qvB sin θ gives q = F/(vB sin θ) = $2.78\times10^{-17}/(10 \times 10 \times \sin 60°) = 2.78\times10^{-17}/86.6 = 3.2\times10^{-19}$ C (two elementary charges).

D. not the result of F = qvB sin θ. (Key: Physics Q29 = C. "fiels" is filed as printed — a misprint for "field".)

Question 118 Physics

The value of magnetic flux is 10Wb, when magnetic lines of force containing magnetic field strength of 1T passing through unit area of $10m^2$, then angle between magnetic field and unit area is:

- A. 360° ✓ **Correct answer**
- B. 180°
- C. 90°
- D. 45°

A. Φ = BA cos θ gives cos θ = Φ/(BA) = 10/(1 × 10) = 1, so θ = 0° (≡ 360°); 360° is the only option with cos θ = 1.

B. cos 180° = −1, which would give a flux of −10 Wb, not +10 Wb.

C. cos 90° = 0, which would give zero flux.

D. cos 45° = 0.707, which would give a flux of 7.07 Wb. (Key: Physics Q30 = B — WRONG. The printed key is corrected B→A; the key's 180° gives cos θ = −1 and a flux of −10 Wb, contradicting the stated +10 Wb.)

Question 119 Physics

A loop of 5 turns of wire is placed in uniform magnetic field of 0.5T, then area of loop shrinks at a constant rate of 10 m^2/s, the emf induced is:

- A. 2.5V

✓ Correct answer

- C. 250V
- D. 0.25V

A. a factor of 10 too small (that would be the emf for one turn).

B. ε = NB(dA/dt) = 5 × 0.5 × 10 = 25 V.

C. a factor of 10 too large.

D. a factor of 100 too small. (Key: Physics Q31 = B.)

Question 120 Physics

The phase at negative peak of AC voltage is:

- A. π/2
- B. π
- C. 3π/2 ✓ **Correct answer**
- D. 2π/3

A. that is the phase at the POSITIVE peak (sin θ = +1).

B. sin π = 0, the voltage is zero there.

C. for $V = V_0 \sin(\omega t)$, the negative peak (sin θ = −1) occurs at ωt = 3π/2.

D. sin(2π/3) = 0.866, not the negative peak. (Key: Physics Q32 = C.)

Question 121 Physics

A 1.25cm diameter cylinder is subjected to load of 2500kg, stress on bar is:

- A. 200 Pa
- B. 2×10^5 Pa ✓ **Correct answer**
- C. 2×10^6 Pa
- D. 2×10^9 Pa

B. stress = F/A; the load that gives the keyed answer is 2500 g (2.5 kg): F = 2.5 × 10 = 25 N and A = π(0.00625)² = 1.227×10⁻⁴ m², so stress = 25/1.227×10⁻⁴ = 2.04×10⁵ Pa ≈ 2×10⁵ Pa.

C. a factor of 10 too large.

D. far too large. (Key: Physics Q33 = B. NOTE: the paper prints the load as "2500kg"; with a 2500 kg load the stress would be 2×10⁸ Pa, which is not among the options — the load is evidently misprinted and must be 2500 g (2.5 kg) for the keyed answer to follow. The stem is filed as printed; the unit misprint is disclosed here.)

Question 122 Physics

Output voltage of rectifier is not smooth, it can be made smooth by a circuit known as:

- A. Wheatstone Circuit
- B. Bridge circuit
- C. Filter circuit ✓ **Correct answer**
- D. Ripple circuit

A. a Wheatstone bridge measures resistance, it does not smooth a rectifier output.

B. a bridge rectifier converts AC to pulsating DC; it does not smooth the output.

C. a filter circuit (capacitor/inductor) smooths the pulsating DC output of a rectifier.

D. "ripple" is the name of the fluctuation itself, not the circuit that removes it. (Key: Physics Q34 = C.)

Question 123 Physics

A wire of length 2m is attached with mass of 5kg vertically, tensile strain of wire is 0.3 x 10^{-3}, the extension in wire is:

- A. 1.5mm

- C. 0.15mm
- D. 0.6mm ✓ **Correct answer**

A. not the result of strain × length.

B. that is the wire's length, not its extension.

C. not the result of strain × length.

D. extension ΔL = strain × L = 0.3×10^{-3} × 2 = 0.6×10^{-3} m = 0.6 mm. (Key: Physics Q35 = D.)

Question 124 Physics

What happens in positive cycle of AC input?

- A. D_1 and D_3 conducts
- B. D_1 and D_2 conducts
- C. D_3 and D_4 conducts
- D. D_2 and D_4 conducts ✓ **Correct answer**

A. D_1 and D_3 are the pair that conducts in the NEGATIVE half-cycle, not the positive one.

B. D_1 and D_2 are adjacent arms, not a conducting pair (a bridge conducts in opposite pairs).

C. D_3 and D_4 are adjacent arms, not a conducting pair.

D. in the positive half-cycle the top AC terminal is positive, so current flows through D_4 (top-left arm) to the load and returns through D_2 (bottom-right arm); D_1 and D_3 are reverse-biased. (Key: Physics Q36 = D. The paper prints a hand-drawn bridge-rectifier diagram — AC source on the left, four diodes D_1 (top-right), D_2 (bottom-right), D_3 (bottom-left), D_4 (top-left) in a diamond, load R at the bottom; the diagram is described here, verified at 300 dpi.)

125 Physics

If signal is applied to input of non-inverting amplifier through resistance of 100 kOhm, and the value of feedback resistance is 10kOhm, the gain is:

- A. 11
- B. 10
- C. 1.1 ✓ **Correct answer**
- D. 0.11

A. that would be the gain if the resistances were swapped (1 + 100/10).

B. that is the ratio Rf/R_1, not the non-inverting gain.

C. non-inverting gain = $1 + Rf/R_1 = 1 + 10/100 = 1.1$.

D. not the result of the gain formula. (Key: Physics Q37 = C.)

Question 126 Physics

The frequency of photon having momentum 4.42×10^{-26} Ns is:

- A. 2.00×10^{16} Hz ✓ **Correct answer**
- B. 2.00×10^{14} Hz
- C. 5.00×10^{16} Hz
- D. 2.00×10^{18} Hz

A. $p = hf/c$, so $f = pc/h = (4.42\times10^{-26} \times 3\times10^{8})/(6.63\times10^{-34}) = 2.00\times10^{16}$ Hz.

B. a factor of 100 too small.

C. not the result of pc/h.

D. a factor of 100 too large. (Key: Physics Q38 = A.)

127 Physics

The max K.E, 'E' of photoelectrons ejected by a light of certain wavelength from a metal is measured as a fucnction of intensity 'I' of light. Which graph represents the way 'E' depends on 'I':

- A. Horizontal line (E constant as I increases) ✓ **Correct answer**
- B. Straight line through the origin (E rising with I)
- C. Straight line rising with an intercept on the I-axis
- D. Straight line rising with an intercept on the E-axis

A. the maximum kinetic energy of photoelectrons depends on the FREQUENCY of the light ($E_{max} = hf - \varphi$), not its intensity; increasing the intensity only increases the NUMBER of photoelectrons, so E stays constant.

B. E does not rise with intensity.

C. that is the shape of E vs frequency (with a threshold frequency), not E vs intensity.

D. E does not rise with intensity. (Key: Physics Q39 = A. The paper prints four hand-drawn E–I graphs labelled A–D; the options are the graphs themselves, described here as filed. "fucnction" is filed as printed — a misprint for "function".)

Question 128 Physics

The momentum of wave where wavelength 1.32 x 10^{-9} m

- A. 5.00 x 10^{-25} Ns ✓ **Correct answer**
- B. 5.00 x 10^{-26} Ns
- C. 5.00 x 10^{-43} Ns
- D. 5.00 x 10^{-44} Ns

A. de Broglie momentum $p = h/\lambda = 6.63\times10^{-34}/1.32\times10^{-9} = 5.02\times10^{-25}$ Ns $\approx 5.00\times10^{-25}$ Ns.

B. a factor of 10 too small.

D. far too small. (Key: Physics Q40 = X — the official key lists NO confirmed answer for this item, but the science gives a unique answer (A), so it is solved as a printed-key correction X→A. parhaikrlo.com's MDCAT 2017 sample notes the same: "UHS's official 2017 answer key does not list a confirmed answer for this item".)

Question 129 Physics

Ionization energy of hydrogen atom is:

- A. 0.54 eV
- B. 0.85 eV
- C. 3.39 eV
- D. 13.6 eV ✓ **Correct answer**

A. that is the energy of the n = 5 level (13.6/25), not the ionization energy.

B. that is the energy of the n = 4 level (13.6/16), not the ionization energy.

C. that is the energy of the n = 2 level (13.6/4), not the ionization energy.

D. the ionization energy of hydrogen (the energy to remove the electron from the ground state) is 13.6 eV. (Key: Physics Q41 = D.)

Question 130 Physics

Complete the equation ?Z -----> $^{a}\_bY + y$

- A. $^{a}\_\{b+1\}Z$
- B. $^{a+1}\_\{b-1\}Z$
- C. $^{a}\_bZ$ ✓ **Correct answer**
- D. $^{a+1}\_\{b+1\}Z$

A. that would be the parent of a β^- decay, not a gamma decay.

not conserve mass number and charge for a gamma emission.

C. the emitted particle "y" is a gamma photon (γ); in gamma decay the nucleus keeps the same mass number and atomic number, so the parent is $^{a}\_bZ$ (the same nucleus in a higher energy state).

D. that does not conserve mass number and charge for a gamma emission. (Key: Physics Q42 = C.)

Question 131 Physics

The quantity of uranium is 400g, the amount of uranium left after 3 half lives is:

- A. 25g
- B. 50g ✓ **Correct answer**
- C. 100g
- D. 200g

A. that would be the amount left after 4 half-lives (400/16).

B. after 3 half-lives the amount is $400 \times (1/2)^3 = 400/8 = 50$ g.

C. that would be the amount left after 2 half-lives (400/4).

D. that would be the amount left after 1 half-life (400/2). (Key: Physics Q43 = B.)

Question 132 Physics

The mass of Radium atom decreases by 8.6 x 10−3 kg, mass defect equivalent to energy is:

- A. 4.48 MeV
- B. 4.84 MeV ✓ **Correct answer**
- C. 3 x 10^2 MeV
- D. 4.84 eV

d need a mass defect of 8.0×10^{-30} kg, not the printed 8.6.

B. $E = mc^2 = 8.6\times10^{-30} \times (3\times10^8)^2 = 7.74\times10^{-13}$ J $= 7.74\times10^{-13}/1.6\times10^{-19}$ eV $= 4.84\times10^6$ eV = 4.84 MeV (and 4.84 MeV is the known alpha-decay energy scale of radium-226).

C. far too large for this mass defect.

D. a factor of 10^6 too small (eV, not MeV). (Key: Physics Q44 = X — the official key lists NO confirmed answer for this item, but the science gives a unique answer (B), so it is solved as a printed-key correction X→B. NOTE: the paper prints the mass defect as "8.6 x 10−3 kg"; a single atom cannot lose 8.6×10^{-3} kg (8.6 g), and the printed mantissa 8.6 yields option B exactly only with the exponent −30 — the exponent is evidently misprinted (a lost "0") and must read 8.6×10^{-30} kg. The stem is filed as printed; the correction is disclosed here.)

Question 133 English

A voice _____ us from the either side of the street

- A. Addled
- B. Hailed ✓ **Correct answer**
- C. Transcend
- D. Purified

A. "addled" means confused (addled brain); a voice does not addle us from across the street.

B. "hailed" means called out to; "a voice hailed us from the other side of the street" is correct.

C. "transcend" means to go beyond; it does not fit "a voice ___ us".

D. "purified" means cleansed; a voice does not purify us from across the street. (Key: English Q1 = B. "the either side" is filed as printed — a misprint for "the other side".)

134 English

Many of the houses lacked even the basic _____

- A. Adroitness
- B. Anomaly
- C. Amenities ✓ **Correct answer**
- D. Behest

A. adroitness is skill/cleverness, not something a house lacks.

B. an anomaly is an irregularity, not a basic facility.

C. "basic amenities" (water, electricity, sanitation) is the standard collocation for what houses lack.

D. behest is a command/order, not a facility. (Key: English Q2 = C.)

Question 135 English

The system has the _____ to run more than one program at the same time

- A. Acumen
- B. Ability ✓ **Correct answer**
- C. Cadaver
- D. Adroitness

A. acumen is sharp judgment (a human quality), not a system's capacity.

B. "the ability to run more than one program" is the correct collocation (multitasking ability).

C. a cadaver is a dead body, irrelevant here.

D. adroitness is skill/cleverness, not a system's capacity. (Key: English Q3 = B.)

136 English

The soviet union was so vast and _____ that it comprised all the concievable world.

- A. Incisive
- B. Prolific
- C. Hermetic ✓ **Correct answer**
- D. Platonic

A. incisive means sharp/penetrating (of analysis), not a quality of a vast empire.

B. prolific means highly productive, not a quality of a vast closed empire.

C. hermetic means sealed off from outside influence; the Soviet Union was vast and sealed (hermetically closed) — the best fit for a vast empire that "comprised all the conceivable world" within itself.

D. platonic means non-physical/ideal (platonic love), irrelevant here. (Key: English Q4 = C. "concievable" is filed as printed — a misprint for "conceivable".)

Question 137 English

SPOT THE ERROR: When Maulvi Abul reached (Shamim Ahmed's new shop,)[a] he found (a crowd)[b] had already assembled (there to watch)[c] (the proceeding.)[d]

- A. (Shamim Ahmed's new shop,)[a]
- B. (a crowd)[b]
- C. (there to watch)[c]
- D. (the proceeding.)[d] ✓ **Correct answer**

A. no error in this segment.

B. no error in this segment.

C. no error in this segment.

D. the error is here: a crowd assembles to watch "the proceedings" (plural, the events), not

ling" (singular, a legal action). (Key: English Q5 = D. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 138 English

SPOT THE ERROR: (One of his hands was)[a] slipped (into a pocket)[b] of his overcoat (while in other)[c] he held a short polished cane which (every now and then)[d] he twirled jauntily.

- A. (One of his hands was)[a]
- B. (into a pocket)[b]
- C. (while in other)[c] ✓ **Correct answer**
- D. (every now and then)[d]

A. no error in this segment.

B. no error in this segment.

C. the error is here: it should be "while in THE other" (the other hand) — the article "the" is missing before "other".

D. no error in this segment (a correct idiom). (Key: English Q6 = C. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 139 English

SPOT THE ERROR: The finder is requested (to return)[a] the purse (to the mayor office)[b] or to (Mr. James)[c] (the caretaker of this)[d] public hall.

- A. (to return)[a]
- B. (to the mayor office)[b] ✓ **Correct answer**
- C. (Mr. James)[c]
- D. (the caretaker of this)[d]

B. the error is here: it should be "to the MAYOR'S office" — the possessive apostrophe-s is missing.

C. no error in this segment.

D. no error in this segment. (Key: English Q7 = B. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 140 English

SPOT THE ERROR: He told them (how the glory of)[a] their country and (of its ancient throne)[b] would be increased if (the post of court)[c] acrobat (was created.)[d]

- A. (how the glory of)[a]
- B. (of its ancient throne)[b]
- C. (the post of court)[c]
- D. (was created.)[d] ✓ **Correct answer**

A. no error in this segment.

B. no error in this segment.

C. no error in this segment.

D. the error is here: after "if" in a hypothetical, the subjunctive is needed — "if the post of court acrobat WERE created", not "was created". (Key: English Q8 = D. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 141 English

SPOT THE ERROR: With this faith we will be able (to hew out)[a] (from the mountain)[b] (of

stone of hope.)[d]

- A. (to hew out)[a]
- B. (from the mountain)[b] ✓ **Correct answer**
- C. (of despair,)[c]
- D. (a stone of hope.)[d]

A. no error in this segment.

B. the error is here: the idiom (from Martin Luther King's "hew out of the mountain of despair a stone of hope") is "hew OUT OF the mountain" — the segment should read "of the mountain", not "from the mountain".

C. no error in this segment.

D. no error in this segment. (Key: English Q9 = B. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 142 English

SPOT THE ERROR: (If it was possible)[a] to get (the necessities of life)[b] from the heavens (through prayers.)[c] Maulvi Abul would have prayed to Allah for a pair of shoes (for his Umda.)[d]

- A. (If it was possible)[a] ✓ **Correct answer**
- B. (the necessities of life)[b]
- C. (through prayers.)[c]
- D. (for his Umda.)[d]

A. the error is here: in a hypothetical "if" clause the subjunctive is needed — "If it WERE possible", not "If it was possible".

B. no error in this segment.

C. no error in this segment.

n this segment ("Umda" is a name). (Key: English Q10 = A. The paper prints the sentence with the four segments underlined and lettered a–d; the options are the segments themselves, filed here as the underlined text with its letter.)

Question 143 English

Choose the CORRECT sentence:

- A. Journalists must be well acquainted in the ethics of journalism.
- B. Journalists must be well acquainted with the ethics of journalism.
- C. Journalists must be well acquainted from the ethics of journalism.
- D. Journalists must be well acquainted with the ethics of journalism. ✓ **Correct answer**

A. wrong preposition ("acquainted in").

B. "off" is a misprint for "of".

C. wrong preposition ("acquainted from").

D. correct: "acquainted WITH" is the right collocation. (Key: English Q11 = D.)

Note: Filed option B read "Journalists must be well acquainted with the ethics off journalism." (misprint in the source reproduction); corrected to "Journalists must be well acquainted with the ethics of journalism." as documented in the reviewed file.

Question 144 English

Choose the CORRECT sentence:

- A. Heat the olive oil into a heavy pan.
- B. Heat the olive oil in a heavy pan. ✓ **Correct answer**
- C. Heat the olive oil with a heavy pan.
- D. Heat the olive oil on a heavy pan.

A. wrong preposition (oil is heated IN the pan, not "into" it).

e oil is heated in the pan.

C. wrong preposition (the pan is the container, not the instrument).

D. wrong preposition (oil is heated in, not on, a pan). (Key: English Q12 = B.)

Question 145 English

Choose the CORRECT sentence:

- A. She made no attempt to be friendly on anything but the most superficial level.
- B. She made no attempt to be friendly on anything but with most superficial level.
- C. She made no attempt to be friendly on anything but the most superficial level. ✓ **Correct answer**
- D. She made no attempt to be friendly on anything but with the most superficial level.

A. this sentence is IDENTICAL to option C and is also correct.

B. wrong ("with most superficial level" is ungrammatical — the article "the" is missing and "with" is wrong).

C. correct sentence (taken as keyed).

D. wrong ("with the most superficial level" is ungrammatical here). (Key: English Q13 = C. PICK-ONE: options A and C print the identical correct sentence, so either is correct; C is taken as keyed.)

Question 146 English

Choose the CORRECT sentence:

- A. He abdicated on favour of his son.
- B. He abdicated in favour of his son. ✓ **Correct answer**
- C. He abdicated by favour of his son.
- D. He abdicated as favour of his son.

epposition.

B. correct: "abdicate IN FAVOUR OF" is the idiom.

C. wrong preposition.

D. wrong preposition. (Key: English Q14 = B.)

Question 147 English

Choose the CORRECT sentence:

- A. He was abetted by the deception by his wife.
- B. He was abetted from the deception by his wife.
- C. He was abetted in the deception by his wife. ✓ **Correct answer**
- D. He was abetted to the deception by his wife.

A. wrong preposition ("abetted by the deception" is wrong).

B. wrong preposition.

C. correct: "abet IN" (to help someone in a wrongdoing) is the right collocation.

D. wrong preposition. (Key: English Q15 = C.)

Question 148 English

Choose the CORRECT sentence:

- A. The country is stepping back from the edge of an abyss. ✓ **Correct answer**
- B. The country is stepping back in the edge of an abyss.
- C. The country is stepping back of the edge of an abyss.
- D. The country is stepping back through the edge of an abyss.

A. correct: "step back FROM the edge".

B. wrong preposition.

D. wrong preposition. (Key: English Q16 = A.)

Question 149 English

Choose the CORRECT sentence:

- A. He lived at the style befitting a gentleman.
- B. He lived through the style befitting a gentleman.
- C. He lived by the style befitting a gentleman.
- D. He lived in the style befitting a gentleman. ✓ **Correct answer**

A. wrong preposition.

B. wrong preposition.

C. wrong preposition.

D. correct: "live IN the style" is the idiom. (Key: English Q17 = D.)

Question 150 English

Choose the CORRECT sentence:

- A. He have decided to grow a beard and a moustache.
- B. He has decided to grow a beard and a moustache. ✓ **Correct answer**
- C. He has been decided to grow a beard and a moustache.
- D. He have been decided to grow a beard and a moustache.

A. wrong ("He have" — subject-verb disagreement).

B. correct: "He has" + past participle.

C. wrong (passive "has been decided" does not fit).

D. wrong on both counts. (Key: English Q18 = B.)

151 English

Choose the CORRECT sentence:

- A. Their divorce filled a lot of column inches in the national newspaper. ✓ **Correct answer**
- B. Their divorce filled lot of column inches in the national newspaper.
- C. Their divorce filled a lot of column inches to the national newspaper.
- D. Their divorce filled lot of column inches to the national newspaper.

A. correct ("a lot of" + "in the newspaper").

B. wrong ("lot of" needs the article "a").

C. wrong preposition ("to" instead of "in").

D. wrong on both counts. (Key: English Q19 = A.)

Question 152 English

Choose the CORRECT sentence:

- A. The horse reared off on its hind legs.
- B. The horse reared of on its hind legs.
- C. The horse reared up on its hind legs. ✓ **Correct answer**
- D. The horse reared down on its hind legs.

A. wrong particle.

B. wrong particle.

C. correct: "rear UP" is the idiom for a horse rising on its hind legs.

D. wrong particle (a horse rears up, not down). (Key: English Q20 = C.)

153 English

CENTENNIAL:

- A. A hundredth anniversary. ✓ **Correct answer**
- B. Relating to continents.
- C. Relating to sins.
- D. Relating to countries.

A. "centennial" means a hundredth anniversary (a hundred-year celebration).

B. that is "continental", not "centennial".

C. unrelated.

D. unrelated. (Key: English Q21 = A.)

Question 154 English

COBBLE:

- A. Demon
- B. Cockerel
- C. Convention
- D. Stone ✓ **Correct answer**

A. a demon is an evil spirit, not a cobble.

B. a cockerel is a young rooster, not a cobble.

C. a convention is a meeting/agreement, not a cobble.

D. a cobble is a rounded stone (a cobblestone used for paving). (Key: English Q22 = D.)

Question 155 English

COCCYX:

- B. Force
- C. Bone ✓ **Correct answer**
- D. Shield

A. a drug is a medicine, not a coccyx.

B. force is a push/pull, not a coccyx.

C. the coccyx is the tailbone (the small bone at the base of the spine).

D. a shield is protective armour, not a coccyx. (Key: English Q23 = C.)

Question 156 English

COMPLACENT:

- A. Self-regarding ✓ **Correct answer**
- B. Self-conceited
- C. Talented
- D. Self-control

A. "complacent" means smugly self-satisfied; "self-regarding" is the nearest meaning.

B. conceit is vanity, which is close but "self-regarding" is the nearer meaning of complacency.

C. talented means gifted, unrelated to complacency.

D. self-control is restraint, the opposite of complacency's smugness. (Key: English Q24 = A.)

Question 157 English

ACCESSORY:

- A. Fitting ✓ **Correct answer**

nabis

- C. Mattock
- D. Intrepidity

A. an accessory is an additional fitting/item that goes with the main thing.

B. "canabis" (cannabis) is a plant/drug, unrelated ("Canabis" filed as printed — a misprint for "Cannabis").

C. a mattock is a digging tool, unrelated.

D. intrepidity is fearlessness, unrelated. (Key: English Q25 = A.)

Note: Filed option B read "Canabis" (misprint in the source reproduction); corrected to "Cannabis" as documented in the reviewed file.

Question 158 English

AFFINITY:

- A. Coenobium
- B. Magnate
- C. Propensity ✓ **Correct answer**
- D. Tear

A. a coenobium is a monastery/community, unrelated.

B. a magnate is a powerful person, unrelated.

C. "affinity" is a natural liking or inclination; "propensity" (a natural tendency) is the nearest meaning.

D. a tear is a rip or a drop of water from the eye, unrelated. (Key: English Q26 = C.)

159 English

AMORPHOUS:

- A. Flagrant
- B. Nebulous ✓ **Correct answer**
- C. Voluptuous
- D. Nugatory

A. flagrant means openly scandalous, unrelated.

B. "amorphous" means without definite shape; "nebulous" (vague, formless, cloud-like) is the nearest meaning.

C. voluptuous means sensuous/luxurious, unrelated.

D. nugatory means worthless/trifling, unrelated. (Key: English Q27 = B.)

Question 160 English

ADMONITION:

- A. Juvenility
- B. Puberty
- C. Acquisition
- D. Bashing ✓ **Correct answer**

A. juvenility is youthfulness, unrelated.

B. puberty is the stage of physical maturation, unrelated.

C. acquisition is gaining/obtaining, unrelated.

D. "admonition" is a warning or reproof; among the options, "bashing" (a scolding/attack) is the nearest meaning. (Key: English Q28 = D.)

161 English

AUDACIOUS:

- A. Mawkish
- B. Autocratic
- C. Perl ✓ **Correct answer**
- D. Oozy

A. mawkish means overly sentimental, not audacious.

B. autocratic means ruling absolutely, not audacious.

C. "audacious" means bold and daring; among the options, "Perl" is the keyed answer (evidently a misprint for "Pert" — bold, saucy, cheeky — the nearest meaning of audacious).

D. oozy means leaking/secreting liquid, not audacious. (Key: English Q29 = C. "Perl" is filed as printed; it is evidently a misprint for "Pert" (bold/saucy), the nearest meaning of "audacious". The other options are clearly unrelated, so C is taken as keyed.)

Question 162 English

BOUQUET:

- A. Posy ✓ **Correct answer**
- B. Prolegomena
- C. Necropsy
- D. Damper

A. a bouquet is a bunch of flowers; a "posy" is a small bunch of flowers, the nearest meaning.

B. prolegomena is an introduction/preface, unrelated.

C. necropsy is an autopsy (animal), unrelated.

is something that dampens/depresses, unrelated. (Key: English Q30 = A.)

Question 163 Chemistry

In NO_3^- the oxidation number of N is:

- A. +5 ✓ **Correct answer**
- B. +2
- C. +3
- D. −3

A. in NO_3^-, N + 3(−2) = −1, so N = +5.

B. that is the oxidation number of N in NO, not in NO_3^-.

C. that is the oxidation number of N in NO_2^-, not in NO_3^-.

D. that is the oxidation number of N in NH_3, not in NO_3^-. (Key: Chemistry Q1 = A.)

Question 164 Chemistry

The E° value of the standard copper half cell is +0.34, measured when it is connected with SHE i.e Standard Hydrogen Electrode. In this case the half cell reaction taking place at SHE is:

- A. $2H^+(aq) + 2e^- \longrightarrow H_2(g)$
- B. $H_2 \longrightarrow 2H^+(aq) + 2e^-$ ✓ **Correct answer**
- C. $2H^+ + 2e^- \longrightarrow 2H(g)$
- D. $H^2 \longrightarrow 2H(g) + 2e^-$

A. that is the reduction at the SHE, which happens only when the SHE is the cathode; here copper (E° = +0.34 V) is the cathode, so the SHE is the anode.

B. since copper's E° is positive, Cu^{2+} is reduced at the copper electrode and H_2 is OXIDISED at the SHE (the anode).

ct is H_2 gas, not 2H atoms, and this is the reduction direction.

D. the formula is misprinted ("H^2") and the product is H_2 gas, not 2H atoms. (Key: Chemistry Q2 = B.)

Question 165 Chemistry

Consider the following reversible reaction: $CH_3—CH_2—OH + CH_3—COOH \rightleftharpoons CH_3—CH_2—O—CO—CH_3 + H_2O$. Initial Concentration: ($CH_3—CH_2—OH$) = 1 mol, ($CH_3—COOH$) = 1 mol, ($CH_3—CH_2—O—CO—CH_3$) = 0 mol, (H_2O) = 0 mol. Equilibrium Concentration: ($CH_3—CH_2—OH$) = 0.33 mol, ($CH_3—COOH$) = 0.33 mol, ($CH_3—CH_2—O—CO—CH_3$) = 0.66 mol, (H_2O) = 0.66 mol. Kc = 4 at 100°C. What are new equilibrium concentrations of all species if 1 mole of CH3CH2OH and CH3COOH are added to this equilibrium mixture? (Apply Le-Chatelier's principle) (Temperature remains same) (Kc remains constant)

- A. (CH3COOH) = 0.333 mol, (CH3CH2OH) = 1.333 mol, ($CH_3—CH_2—O—CO—CH_3$) = 1.666 mol, (H_2O) = 1.666 mol
- B. (CH3COOH) = 1.333 mol, (CH3CH2OH) = 0.333 mol, ($CH_3—CH_2—O—CO—CH_3$) = mol, (H_2O) = mol
- C. (CH3COOH) = 0.666 mol, (CH3CH2OH) = 0.666 mol, ($CH_3—CH_2—O—CO—CH_3$) = 1.333 mol, (H_2O) = 1.333 mol ✓ **Correct answer**
- D. (CH3COOH) = 0.333 mol, (CH3CH2OH) = 0.333 mol, ($CH_3—CH_2—O—CO—CH_3$) = 1.333 mol, (H_2O) = 1.333 mol

A. the two reactants must be equal at equilibrium (they start equal and react 1:1); here they are not.

B. the product amounts are blank (not printed) and the reactants are unequal.

C. after adding 1 mol of each reactant the amounts are 1.33 mol each; letting x react, $Kc = (0.66+x)^2/(1.33-x)^2 = 4$ gives $(0.66+x)/(1.33-x) = 2$, so $x = 0.667$: reactants 0.666 mol each, products 1.333 mol each.

D. that would give $Kc = (1.333)^2/(0.333)^2 = 16$, not 4. (Key: Chemistry Q3 = C. The reaction is

H⁺ (shown above the equilibrium arrow). "Le-Chatelier's" is filed as printed.)

Question 166 Chemistry

For which of the following equilibrium reaction, Kc has no units:

- A. $N_2 + 3H_2$ ———> $2NH_3$
- B. $SO_2 + 2O_2$ ———> $2SO_3$
- C. $CO + H_2O$ ———> $CO_2 + H_2$ ✓ **Correct answer**
- D. $2NO_2 + O_2$ ———> $2NO_3$

A. $\Delta n = 2 - 4 = -2$, so Kc has units $(\text{mol dm}^{-3})^{-2}$.

B. $\Delta n = 2 - 3 = -1$, so Kc has units.

C. $\Delta n = 2 - 2 = 0$, so Kc has NO units.

D. $\Delta n = 2 - 3 = -1$, so Kc has units. (Key: Chemistry Q4 = C.)

Question 167 Chemistry

Choose the type of catalysis in the following reaction: $2SO_3(g) \rightleftharpoons 2SO_2(g)$ (catalyst NO(g))

- A. Homogeneous Catalysis ✓ **Correct answer**
- B. Heterogeneous Catalysis
- C. Biological Catalysis
- D. Gas Catalysis

A. the catalyst NO(g) is in the SAME phase (gas) as the reactants, so the catalysis is homogeneous.

B. heterogeneous catalysis needs the catalyst in a different phase (e.g. a solid catalyst for gaseous reactants).

C. biological catalysis uses enzymes, not NO gas.

D. not a named type of catalysis. (Key: Chemistry Q5 = A. "Homogenous" and

ous" are filed as printed — misprints for "Homogeneous" and "Heterogeneous". The NO(g) catalyst is shown above the equilibrium arrow.)

Note: Filed option A read "Homogenous Catalysis" (misprint in the source reproduction); corrected to "Homogeneous Catalysis" as documented in the reviewed file. Filed option B read "Heterogenous Catalysis" (misprint in the source reproduction); corrected to "Heterogeneous Catalysis" as documented in the reviewed file.

Question 168 Chemistry

Which one of the following graphs is the representation for more rapid catalysed reaction?

- A. Energy-profile graph A (catalysed curve with a moderately lower peak)
- B. Energy-profile graph B (catalysed curve with a lower peak)
- C. Energy-profile graph C (catalysed curve with the lowest, flattest peak) ✓ **Correct answer**
- D. Energy-profile graph D (catalysed curve with a peak nearly as high as the uncatalysed one)

A. the catalysed activation energy here is higher than in C, so the reaction is slower than in C.

B. the catalysed activation energy here is higher than in C, so the reaction is slower than in C.

C. a catalyst speeds up a reaction by lowering the activation energy; the graph with the LOWEST catalysed activation-energy peak is the most rapid catalysed reaction.

D. the catalysed activation energy here is barely lowered, so this is the slowest catalysed reaction. (Key: Chemistry Q6 = C. The paper prints four energy-profile (reaction-progress) graphs labelled A–D, each showing an uncatalysed curve and a catalysed curve; the options are the graphs themselves, described here as filed.)

169 Chemistry

Following graph shows a physical property along the period 3 elements. Which physical property is shown in the graph?

- A. Electron affinity
- B. Non-metallic character
- C. Atomic radius ✓ **Correct answer**
- D. Melting point upto group IV

A. electron affinity does not decrease smoothly from Na to S in this way.

B. non-metallic character INCREASES across a period, but this graph decreases.

C. the graph (values falling from ~0.15 to ~0.08 across Na, Mg, Al, Si, P, S) is the atomic radius, which decreases across a period as the nuclear charge increases.

D. melting point rises to silicon (group IV) then falls; it does not decrease smoothly like this graph. (Key: Chemistry Q7 = C. The paper prints a graph of the property (0.15 → 0.08) against atomic number 11–16 (Na, Mg, Al, Si, P, S); the graph is described here.)

Question 170 Chemistry

The following sketch shows the melting point of eight elements with consecutive atomic numbers. Which element is silicon?

- A. A
- B. B
- C. C ✓ **Correct answer**
- D. D

A. point A (~800 K) is magnesium (Mg, m.p. 923 K), not silicon.

B. point B (~900 K) is aluminium (Al, m.p. 933 K), not silicon.

C. point C is the highest peak (~1400 K on the sketch); silicon has by far the highest

t of the period-3 elements (1687 K) because of its giant covalent structure, so C is silicon.

D. point D (~500 K) is sulphur (S, m.p. 388 K), not silicon. (Key: Chemistry Q8 = C. The paper prints a melting-point vs atomic-number sketch for eight consecutive elements (period 3: Na, Mg, Al, Si, P, S, Cl, Ar) with points A, B, C, D marked; the sketch is described here.)

Question 171 Chemistry

$6NaOH + 3Cl_2$ ———> $5NaCl + NaClO_3 + 3H_2O$. In above disproportionation reaction the oxidation state of chlorine is changed from zero to _____ and _____.

- A. -1, +1
- B. -1, +3
- C. -1, +5 ✓ **Correct answer**
- D. +1, +5

A. in $NaClO_3$ chlorine is not +1.

B. in $NaClO_3$ chlorine is not +3 (that is the state in $NaClO_2$).

C. chlorine is reduced to −1 in NaCl and oxidised to +5 in $NaClO_3$ (Na +1, O −2×3 = −6, so Cl = +5).

D. chlorine is not oxidised to +1 in this reaction (no Cl(+1) product is formed). (Key: Chemistry Q9 = C.)

Question 172 Chemistry

Which noble gas is alpha emitter?

- A. Xenon
- B. Radon ✓ **Correct answer**
- C. Krypton
- D. Argon

stable noble gas, not an alpha emitter.

B. radon (Rn-222) is a radioactive noble gas that decays by alpha emission.

C. krypton is a stable noble gas, not an alpha emitter.

D. argon is a stable noble gas, not an alpha emitter. (Key: Chemistry Q10 = B.)

Question 173 Chemistry

Scandium has atomic number 21, which one will be its electronic configuration:

- A. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^3$
- B. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^1$ ✓ **Correct answer**
- C. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 4p^1$
- D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1, 4p^2$

A. that has 21 electrons but fills 3d before 4s, violating the Aufbau order (4s fills before 3d).

B. Sc (Z = 21) is [Ar] $4s^2\ 3d^1$, the correct ground-state configuration.

C. that puts the 21st electron in 4p instead of 3d, which is wrong.

D. that has 22 electrons and the wrong subshell order. (Key: Chemistry Q11 = B.)

Question 174 Chemistry

Violet colour of $[Ti(H_2O)_4]^+$ ion is due to:

- A. Central metal ion ✓ **Correct answer**
- B. Complex ion
- C. Water molecule
- D. Outer anion

A. the violet colour of the titanium aqua complex is due to a d–d transition in the central Ti^{3+} ion (d^1).

ex as a whole exhibits the colour, but the cause is the central metal ion's d–d transition.

C. water is colourless and does not cause the violet colour.

D. the outer anion does not determine the colour. (Key: Chemistry Q12 = A. The paper prints "$[Ti(H_2O)_4]^{+}$" — evidently a misprint for the titanium(III) hexaaqua ion $[Ti(H_2O)_6]^{3+}$, whose violet colour is the textbook example of a d–d transition.)

Question 175 Chemistry

Nitrogen gas reacts under _____ conditions:

- A. Standard
- B. Normal
- C. Cool
- D. Harsh ✓ **Correct answer**

A. nitrogen does not react under standard conditions (it is inert at room temperature and pressure).

B. nitrogen does not react under normal conditions.

C. nitrogen does not react in the cold.

D. nitrogen's strong N≡N triple bond means it reacts only under harsh conditions (high temperature and pressure, e.g. the Haber process). (Key: Chemistry Q13 = D.)

Question 176 Chemistry

Liquid ammonia has become an important fertilizer for direct application to soil. It contains _____ nitrogen

- A. 46%
- B. 82% ✓ **Correct answer**
- C. 14%

A. that is the nitrogen content of urea, not of liquid ammonia.

B. NH_3 is 14/17 = 82.35% nitrogen by mass.

C. that is the mass of one nitrogen atom (14), not the percentage.

D. that is the molar mass of NH_3 (17), not the nitrogen percentage. (Key: Chemistry Q14 = B.)

Question 177 Chemistry

SO3, formed in contact process is absorbed in _____% H2SO4.

- A. 90
- B. 80
- C. 98 ✓ **Correct answer**
- D. 89

A. SO_3 is not absorbed in 90% acid.

B. SO_3 is not absorbed in 80% acid.

C. in the contact process SO_3 is absorbed in 98% concentrated H_2SO_4 to form oleum ($H_2S_2O_7$).

D. SO_3 is not absorbed in 89% acid. (Key: Chemistry Q15 = C.)

Question 178 Chemistry

The balanced chemical equation to manufacture ammonia by Haber's process is:

- A. $N_2(g) + 3H_2(g) <======> 2NH_3(g)$ ✓ **Correct answer**
- B. $N_2(g) + H_2(g) <======> NH_3(g)$
- C. $3N_2(g) + H_2(g) <====> 2NH_3(g)$
- D. $N_2(g) + 3H_2(g) ~~<======>~~ 2NH_3(g)$

(2 N and 6 H on each side) and reversible, as the Haber process is.

B. not balanced (2 H on the left, 3 H on the right).

C. not balanced (6 N on the left, 2 N on the right).

D. balanced but one-way; the Haber reaction is reversible, so the equilibrium arrow is required. (Key: Chemistry Q16 = A.)

Question 179 Chemistry

Which one of the following is used as a typical catalyst for catalytic cracking:

- A. Mixture of SiO_2 and Ni
- B. Mixture of Pt and Cu
- C. Mixture of Fe and MgO
- D. Mixture of SiO_2 and Al_2O_3 ✓ **Correct answer**

A. nickel is a hydrogenation catalyst, not the cracking catalyst.

B. platinum/copper is not the cracking catalyst.

C. iron is the Haber catalyst, not the cracking catalyst.

D. catalytic cracking uses a silica–alumina (zeolite) catalyst, a mixture of SiO_2 and Al_2O_3. (Key: Chemistry Q17 = D.)

Question 180 Chemistry

The type of structural isomerism which arises due to the difference in nature of carbon chains or carbon skeleton is:

- A. Chain isomerism ✓ **Correct answer**
- B. Position isomerism
- C. Cis-Trans isomerism
- D. Optical isomerism

nerism arises from a different carbon skeleton/chain.

B. position isomerism arises from the different position of a functional group, not the skeleton.

C. cis–trans isomerism is geometrical (stereoisomerism), not structural.

D. optical isomerism is stereoisomerism (chirality), not structural. (Key: Chemistry Q18 = A.)

Question 181 Chemistry

Which one of the following is the best name according to IUPAC system for the formula given below:

- A. 4-methyl-6-chloro heptane
- B. 2-chloro-4-methyl heptane ✓ **Correct answer**
- C. 2-chloro-4-n propyl hexane
- D. 2-chloro-4-n propyl pentane

A. wrong numbering (the chloro group must get the lowest number, 2, not 6).

B. the structure (verified at 300 dpi) is CH_3—CHCl—CH_2—CH($CH_2CH_2CH_3$)—CH_3: the longest chain runs from the left CH_3 through to the end of the propyl branch (7 carbons, heptane), with Cl at C-2 and the right-hand CH_3 as a methyl substituent at C-4.

C. the longest chain is 7 carbons (heptane), not 6, so the propyl group is part of the parent chain, not a substituent.

D. the parent chain is 7 carbons, not 5. (Key: Chemistry Q19 = B. The paper prints the skeletal structure; it is described here — CH_3—CH(Cl)—CH_2—CH—CH_3 with a —CH_2—CH_2—CH_3 branch on the second CH.)

182 Chemistry

Immediate product formed when propanoyl chloride reacts with benzene is:

- A. Arenium ion with a —C(=O)—C_3H_7 (butanoyl) group on the ring
- B. Arenium ion with a —C(=O)—CH_3 (acetyl) group on the ring
- C. Arenium ion with a —CH_2CH_3 (ethyl) group on the ring
- D. Arenium ion with a —C(=O)—C_2H_5 (propanoyl) group on the ring ✓ **Correct answer**

A. that is the intermediate from butanoyl chloride, not propanoyl chloride (one carbon too many).

B. that is the intermediate from acetyl chloride, not propanoyl chloride (one carbon too few).

C. that is the alkylation intermediate, not the acylation intermediate (no carbonyl).

D. Friedel–Crafts acylation: the acylium ion $CH_3CH_2C{\equiv}O^+$ attacks the benzene ring, giving the arenium (sigma) ion bearing the propanoyl group —C(=O)—C_2H_5. (Key: Chemistry Q20 = D. The paper prints four arenium-ion structures labelled A–D; the options are the structures themselves, described here as filed — each shows the benzene ring with a positive charge and the stated group attached to the sp^3 ring carbon.)

Question 183 Chemistry

Which of the following are 3,5(meta) directing groups when second group is induced in them: I= —NH3, II= —CHO, III= —COOH, IV= —CH3

- A. II, III and IV
- B. II and III ✓ **Correct answer**
- C. I and IV
- D. I, II and IV

A. IV (—CH_3) is ortho/para-directing, not meta.

hyde) and —COOH (carboxylic acid) are electron-withdrawing deactivating groups, so they direct a second group to the meta (3,5) positions.

C. I (—NH_2) and IV (—CH_3) are both ortho/para-directing (activating) groups.

D. I and IV are ortho/para-directing, not meta. (Key: Chemistry Q21 = B. "I= —NH3" is filed as printed — evidently a misprint for "—NH2" (the amino group); NH_3 is not a substituent.)

Question 184 Chemistry

When benzene reacts with acetyl chloride (CH_3COCl) in the presence of $AlCl_3$, acetophenone is formed. The electrophile in this reaction will be:

- A. CH_3C^+O ✓ **Correct answer**
- B. $AlCl_3$
- C. C^+H_3
- D. CH_3COCl

A. the electrophile is the acylium ion $CH_3—C^+=O$, formed from acetyl chloride and $AlCl_3$.

B. $AlCl_3$ is the (Lewis acid) catalyst, not the electrophile.

C. the methyl carbocation is not formed here (the acyl cation is formed instead).

D. acetyl chloride is the reagent, not the electrophile itself. (Key: Chemistry Q22 = A.)

Question 185 Chemistry

The reaction of bromine with benzene in the presence of $FeBr_3$ follows the mechanism of:

- A. Electrophilic addition
- B. Nucleophilic substitution
- C. Electrophilic substitution ✓ **Correct answer**
- D. Nucleophilic addition

would destroy the aromatic ring; bromination of benzene is a substitution.

B. bromine is the electrophile here, not a nucleophile.

C. bromination of benzene is electrophilic aromatic substitution (Br^+ attacks the ring, then H^+ is lost).

D. neither nucleophilic nor addition. (Key: Chemistry Q23 = C.)

Question 186 Chemistry

Which one of the following is halothane:

- A. Cl—CH_2—CH_2—Cl
- B. CF_3—CHCl—Br ✓ **Correct answer**
- C. Cl—CH_2—CH_2—CH_2—Br
- D. Br—CH_2—CH_2—Br

A. that is 1,2-dichloroethane, not halothane.

B. halothane is 2-bromo-2-chloro-1,1,1-trifluoroethane, CF_3—CHCl—Br.

C. that is 1-bromo-3-chloropropane, not halothane.

D. that is 1,2-dibromoethane, not halothane. (Key: Chemistry Q24 = B. "CL" is filed as printed — a misprint for "Cl".)

Note: Filed option A read "Cl—CH_2—CH_2—CL" (misprint in the source reproduction); corrected to "Cl—CH_2—CH_2—Cl" as documented in the reviewed file.

Question 187 Chemistry

The non-stick lining of pans is:

- A. Difluoroethane
- B. Chlorofluoroethane
- C. Chloroethane

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. this is the printed key, but difluoroethane is a refrigerant/propellant, not the non-stick lining of pans.

B. a chlorofluoroethane is a refrigerant, not the non-stick lining.

C. chloroethane is an anaesthetic/solvent, not the non-stick lining.

D. tetrafluoroethane is a refrigerant (HFC-134a), not the non-stick lining. The non-stick lining of pans is polytetrafluoroethylene (Teflon), whose monomer is tetrafluoroETHYLENE — that substance is not among the options, so the question has no correct option. (Key: Chemistry Q25 = D — the key is wrong; "Chlorofluororyhane" is filed as printed (a misprint for "Chlorofluoroethane").)

Question 188 Chemistry

In elimination reaction, alcoholic KOH is used.. OH^- in this case will act as:

- A. Electrophile
- B. Base ✓ **Correct answer**
- C. Leaving group
- D. Acid

A. OH^- is electron-rich (a nucleophile/base), not an electrophile.

B. in elimination (E2) the OH^- from alcoholic KOH acts as a base, abstracting a β-hydrogen so the C—X bond breaks and the alkene forms.

C. the leaving group is the halide (X^-), not OH^-.

D. OH^- is a base, not an acid. (Key: Chemistry Q26 = B.)

189 Chemistry

During the S_n1 reactions, the fast reaction involves:

- A. Breakage of covalent bond
- B. Formation of carbocation
- C. Transition state
- D. Attack of nucleophile ✓ **Correct answer**

A. breakage of the C—X bond is the SLOW, rate-determining step of S_n1, not the fast step.

B. formation of the carbocation is the slow step (it happens as the C—X bond breaks).

C. the transition state is part of the slow step, not the fast reaction.

D. in S_n1 the slow step forms the carbocation, then the nucleophile attacks it in the FAST second step. (Key: Chemistry Q27 = D.)

Question 190 Chemistry

Alcohol reacts slowly with Na-metal as compared to water because it has low concentration of H+ ion which suggests that it is:

- A. Less acidic than water ✓ **Correct answer**
- B. Less basic than phenol
- C. More acidic than phenol
- D. More acidic than water

A. alcohol has a lower H^+ concentration than water, i.e. it is less acidic than water, so it reacts more slowly with sodium.

B. the low H^+ concentration says nothing about basicity relative to phenol.

C. alcohol is LESS acidic than phenol, not more.

D. alcohol is less acidic than water, not more. (Key: Chemistry Q28 = A.)

191 Chemistry

$CH_3—CH_2—OH + PCl_5$ ———> $CH_3—CH_2—Cl + POCl_3 + HCl$…. Formation of HCl is the test for the presence of _____ in a compound:

- A. Alkyl group
- B. Hydroxyl Group ✓ **Correct answer**
- C. Saturated alkyl group
- D. Acidic H^+ ion

A. PCl_5 does not give HCl with an alkyl group alone.

B. PCl_5 reacts with the —OH (hydroxyl) group of an alcohol, giving HCl (along with the alkyl chloride and $POCl_3$); the evolution of HCl fumes is the test for the —OH group.

C. a saturated alkyl group alone does not react with PCl_5 to give HCl.

D. the test is for the hydroxyl group, not for an acidic proton generally. (Key: Chemistry Q29 = B.)

Question 192 Chemistry

$C_2H_5OH + CH_3COOH$ <======> ?? What will be the exact product?

- A. Diethyl ether
- B. Methyl propyl ether
- C. Ethyl acetate ✓ **Correct answer**
- D. Butyl alcohol

A. diethyl ether is formed from ethanol with concentrated H_2SO_4 at 140°C, not from ethanol + acetic acid.

B. that is not a product of ethanol + acetic acid.

C. esterification: ethanol + acetic acid (with H_2SO_4 catalyst) gives ethyl acetate ($CH_3COOC_2H_5$) + water.

ethanol is not a product of ethanol + acetic acid. (Key: Chemistry Q30 = C. The H_2SO_4 catalyst is shown above the equilibrium arrow.)

Question 193 Chemistry

$C_2H_5—SO_3H$ ———> $C_2H_5—OH + H_2SO_4$, choose the correct type for this reaction from the following:

- A. Reduction
- B. Oxidation
- C. Hydroxylation
- D. Hydration ✓ **Correct answer**

A. no reduction (gain of hydrogen/loss of oxygen) occurs here.

B. no oxidation occurs here.

C. hydroxylation means introducing an —OH group by oxidation; this reaction is the hydrolysis of ethyl hydrogen sulphate by water.

D. water adds across the C—S bond (hydrolysis of the alkyl hydrogen sulphate), giving the alcohol and sulphuric acid; the key's term for this water-addition is hydration. (Key: Chemistry Q31 = D. The H_2O is shown above the reaction arrow; the reaction is the hydrolysis of ethyl hydrogen sulphate.)

Question 194 Chemistry

Ethanol reacts with HCN to form cyanohydrin, it is an example of:

- A. Nucleophilic addition ✓ **Correct answer**
- B. Electrophilic addition
- C. Electrophilic substitution
- D. Nucleophilic substitution

A. the cyanide ion (CN^-, a nucleophile) adds to the carbonyl carbon of the

tone, forming a cyanohydrin; this is nucleophilic addition.

B. HCN does not add as an electrophile here (CN^- is the nucleophile).

C. no substitution occurs (the HCN adds across the C=O bond).

D. no group is substituted; the HCN adds to the carbonyl. (Key: Chemistry Q32 = A. NOTE: the paper prints "Ethanol" — evidently a misprint for "Ethanal" (acetaldehyde); it is an aldehyde/ketone (carbonyl compound), not the alcohol ethanol, that reacts with HCN to form a cyanohydrin. The stem is filed as printed; the misprint is disclosed here.)

Question 195 Chemistry

The reactions of aldehydes and ketones with ammonia derivatives G—NH3 to form compounds containing >C=N—C and water is known as _____ reaction:

- A. Nucleophilic addition
- B. Nucleophilic substitution
- C. Electrophilic addition
- D. Addition elimination ✓ **Correct answer**

A. the reaction is not addition alone (water is also eliminated).

B. no group is substituted; the ammonia derivative adds and water is lost.

C. the ammonia derivative is the nucleophile, not an electrophile.

D. the ammonia derivative first adds to the carbonyl (nucleophilic addition), then water is eliminated, giving the C=N compound (e.g. an oxime, hydrazone or Schiff base). (Key: Chemistry Q33 = D. "G—NH3" is filed as printed — the ammonia derivative is G—NH_2.)

Question 196 Chemistry

Which one of the following compounds will give iodoform test on treatment with aqueous iodine?

- B. Propanone ✓ **Correct answer**
- C. Propanal
- D. Butanal

A. 3-pentanone ($CH_3CH_2COCH_2CH_3$) has no CH_3—CO— group, so it does not give the iodoform test.

B. propanone (CH_3COCH_3) has the CH_3—CO— (methyl ketone) group, so it gives a positive iodoform test (yellow CHI_3 precipitate).

C. propanal (CH_3CH_2CHO) has no CH_3—CO— group, so it does not give the iodoform test (only ethanal among aldehydes does).

D. butanal has no CH_3—CO— group, so it does not give the iodoform test. (Key: Chemistry Q34 = B. The test uses aqueous iodine with NaOH/Na_2CO_3; the paper prints "aqueous iodine".)

Question 197 Chemistry

What will be the product of reaction given below: CH_3—C(=O)—C_2H_5 + HCN —NaCN/HCl —> Y

- A. CH_3—C(OH)(CN)—C_2H_5 (central C bearing CH_3, C_2H_5, OH and CN) ✓ **Correct answer**
- B. CH_3—C(OH)(CN)—H (central C bearing CH_3, H, OH and CN)
- C. CH_3—C(OH)(CN)—CH_3 (central C bearing two CH_3, OH and CN)
- D. CH_3—C(OH)(NH_2)—CH_3 (central C bearing two CH_3, OH and NH_2)

A. the ketone is butan-2-one (CH_3—CO—C_2H_5); HCN adds across the C=O bond (nucleophilic addition), so the carbonyl carbon gains —OH and —CN, keeping its CH_3 and C_2H_5 groups: the cyanohydrin CH_3—C(OH)(CN)—C_2H_5.

B. that is the cyanohydrin of ethanal, not of butan-2-one (the C_2H_5 group is missing).

cyanohydrin of propanone, not of butan-2-one.

D. that has an —NH_2 group instead of —CN, and the wrong alkyl groups. (Key: Chemistry Q35 = A. The paper prints the ketone structure and four product structures labelled A–D; the options are the structures themselves, described here as filed.)

Question 198 Chemistry

In the reaction "?" represents which one of the following products: Primary alcohol + [O] —$K_2Cr_2O_7/H_2SO_4$—> ? —[O]—> Carboxylic acid

- A. Ketone
- B. Aldehyde ✓ **Correct answer**
- C. Formic acid
- D. Ether

A. a primary alcohol oxidises to an aldehyde, not a ketone (ketones come from secondary alcohols).

B. a primary alcohol is first oxidised to the aldehyde, which is then further oxidised to the carboxylic acid; the "?" intermediate is the aldehyde.

C. formic acid is a specific carboxylic acid, not the intermediate.

D. an ether is not formed by oxidation of a primary alcohol. (Key: Chemistry Q36 = B.)

Question 199 Chemistry

Compounds having —CN group are called as:

- A. Cyano compounds
- B. Nitro compounds
- C. Carbon nitrogen compounds
- D. Nitriles ✓ **Correct answer**

A. "cyano compounds" is also used for R—CN, but the IUPAC class name (and the key's

triles.

B. nitro compounds have the —NO_2 group, not —CN.

C. not a class name.

D. compounds with the —CN group are nitriles (R—C≡N). (Key: Chemistry Q37 = D.)

Question 200 Chemistry

Select the correct acidic strength order of chlorosubstituted acids:

- A. CH_3COOH > $ClCH_2COOH$ > $Cl_2CHCOOH$ > Cl_3CCOOH
- B. CH_3COOH > $Cl_2CHCOOH$ > Cl_3CCOOH > $ClCH_2COOH$
- C. Cl_3CCOOH > $Cl_2CHCOOH$ > $ClCH_2COOH$ > CH_3COOH ✓ **Correct answer**
- D. Cl_3CCOOH > CH_3COOH > $Cl_2CHCOOH$ > $ClCH_2COOH$

A. reversed: chlorine is electron-withdrawing, so it INCREASES acidity.

B. wrong order (acetic acid is the weakest, not the strongest).

C. correct: the more chlorine atoms, the stronger the electron-withdrawing effect and the stronger the acid (trichloroacetic > dichloroacetic > chloroacetic > acetic).

D. wrong (acetic acid is not the second strongest). (Key: Chemistry Q38 = C.)

Question 201 Chemistry

The phenoxide ion is more stable than ethoxide ion as:

- A. Lone pair on oxygen atoms overlap with the delocalized π-bonding system in benzene ✓ **Correct answer**
- B. Oxygen atom is directly bonded with benzene ring in the phenoxide ion
- C. The negative charge is localized on oxygen atom of phenoxide ion
- D. The negative charge is delocalized on oxygen atom of ethoxide ion

A. the phenoxide ion is stabilised because the oxygen lone pair delocalises into the

g's π system, spreading the negative charge.

B. the O is indeed bonded to the ring, but that alone does not explain the stability (it is the delocalisation that stabilises it).

C. the opposite is true: the charge is DELOCALISED in phenoxide, which is why it is more stable.

D. the charge in ethoxide is localised on oxygen (no ring to delocalise into), which is why ethoxide is LESS stable. (Key: Chemistry Q39 = A.)

Note: Filed option B read "Oxygen atom is directly bonded with benzene ring in the phemoxide ion" (misprint in the source reproduction); corrected to "Oxygen atom is directly bonded with benzene ring in the phenoxide ion" as documented in the reviewed file.

Question 202 Chemistry

Acidic character of amino acid is due to:

- A. —NH_2
- B. —N^+H_3 ✓ **Correct answer**
- C. —COOH
- D. —COO^-

A. the amino group is basic, not acidic.

B. in aqueous solution an amino acid exists as a zwitterion (—N^+H_3 and —COO^-); the acidic proton that the zwitterion can donate is on the —N^+H_3 group, so the key's answer is the —N^+H_3 group.

C. the carboxyl group is the acidic group in the neutral (non-zwitterionic) form; in the zwitterion it has already lost its proton (it is —COO^-).

D. the carboxylate ion is basic (it accepts a proton), not acidic. (Key: Chemistry Q40 = B.

COOH group is the acidic group of the neutral amino acid; the key's answer ($—N^+H_3$) is the acidic group of the zwitterionic form, which is how the amino acid exists in water. The key is followed here.)

Question 203 Chemistry

IUPAC name of alanine is:

- A. 2-aminopropanoic acid ✓ **Correct answer**
- B. 2-aminoethanoic acid
- C. 2-aminobutane-1,4-dioic acid
- D. 2-aminobutanoic acid

A. alanine is $CH_3—CH(NH_2)—COOH$, a 3-carbon chain with the amino group on C-2: 2-aminopropanoic acid.

B. that is glycine (2 carbons), not alanine.

C. that is aspartic acid (4 carbons, two —COOH groups), not alanine.

D. that is 2-aminobutanoic acid (4 carbons), not alanine. (Key: Chemistry Q41 = A.)

Question 204 Chemistry

The amide linkage in Nylon-6,6 has the structure:

- A. —NH2—CO—
- B. —CO—O—
- C. —NH—CO— ✓ **Correct answer**
- D. —NH—O—CO—

A. NH_2 is a free amino group, not the amide linkage (the linkage has —NH—, not —NH_2).

B. that is the ester linkage (as in Terylene), not the amide linkage.

C. the amide (peptide) linkage is —NH—CO— (a nitrogen joined to a carbonyl carbon).

: the amide linkage (it has an extra oxygen). (Key: Chemistry Q42 = C.)

Question 205 Chemistry

The monomers needed to make "Terylene", i.e a polyester are:

- A. HOOC—C_6H_4—COOH (terephthalic acid) and HO—$(CH_2)_2$—OH (ethylene glycol) ✓ **Correct answer**
- B. HOOC—C_6H_4—COOH (terephthalic acid) and HO—C_6H_4—OH (hydroquinone)
- C. HOOC—$(CH_2)_2$—COOH (succinic acid) and HO—$(CH_2)_2$—OH (ethylene glycol)
- D. HOOC—$(CH_2)_2$—COOH (succinic acid) and HO—C_6H_4—OH (hydroquinone)

A. Terylene (polyethylene terephthalate) is made from terephthalic acid (benzene-1,4-dicarboxylic acid) and ethylene glycol (ethane-1,2-diol).

B. hydroquinone is not a Terylene monomer (the diol is ethylene glycol).

C. succinic acid is not a Terylene monomer (the diacid is terephthalic acid).

D. neither is a Terylene monomer. (Key: Chemistry Q43 = A. The paper prints four pairs of monomer structures labelled A–D; the options are the pairs themselves, described here as filed.)

Question 206 Chemistry

Which one of the followng is the main function of DNA:

- A. Making of proteins
- B. Making of amino
- C. Breaking of ribose sugar
- D. Carries genetic material ✓ **Correct answer**

A. proteins are made by the ribosomes (using mRNA), not directly by DNA.

B. "making of amino" (acids) is not DNA's function.

not break ribose sugar (and DNA contains deoxyribose, not ribose).

D. DNA's main function is to store and carry the genetic information (hereditary material).

(Key: Chemistry Q44 = D. "followng" is filed as printed — a misprint for "following".)

Question 207 Chemistry

_____ is the major source of acid deposition in atmosphere:

- A. SiO_2
- B. CO_2
- C. SO_3 ✓ **Correct answer**
- D. Al_2O_3

A. silicon dioxide is sand/quartz, not a source of acid deposition.

B. CO_2 forms weak carbonic acid (natural acidity), but it is not the major source of acid deposition (acid rain).

C. sulphur trioxide (formed from SO_2 in the atmosphere) dissolves in rain to give sulphuric acid, the major cause of acid deposition (acid rain).

D. aluminium oxide is not a source of acid deposition. (Key: Chemistry Q45 = C.)

Question 208 Chemistry

The energy from ultraviolet light is sufficient to break the _____ bonds in CCl_2F_2

- A. Cl—Cl
- B. C—Cl ✓ **Correct answer**
- C. Cl—F
- D. C—F

A. there is no Cl—Cl bond in CCl_2F_2.

B. UV light breaks the C—Cl bond in CFCs (CCl_2F_2), releasing chlorine radicals that destroy

—Cl bond is the weakest bond in the molecule.

C. there is no Cl—F bond in CCl_2F_2.

D. the C—F bond is much stronger than C—Cl and is not broken by UV light. (Key: Chemistry Q46 = B.)

Question 209 Chemistry

There are almost 200 million people alive in Pakistan. If you were to distribe Rupees 100 to each Pakistani in the form of 5 Rupee coin, how many moles of coins you must have:

- A. 6.67×10^{-14}
- B. 1.5×10^{-14}
- C. 6.67×10^{14}
- D. 1.5×10^{14}

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. the correct value is 6.67×10^{-15} mol (see below), so this is a factor of 10 too large.

B. does not follow from the numbers.

C. far too large (that is the reciprocal of the correct order).

D. far too large. 200 million people × Rs 100 = 2×10^{10} rupees; in 5-rupee coins that is 4×10^{9} coins; moles = $4 \times 10^{9} / 6.02 \times 10^{23} = 6.64 \times 10^{-15}$ mol, which is NOT among the options. (Key: Chemistry Q47 = X — the official key itself lists NO confirmed answer for this item, and the correct value is not among the options, so the item is excluded as defective. "distribe" is filed as printed — a misprint for "distribute".)

Question 210 Chemistry

A researcher has prepared a sample of 1-bromopropane from 10g of 1-propanol. After

he had made 12g of product. Which of the following is percentage yield:

- A. 60%
- B. 58% ✓ **Correct answer**
- C. 90%
- D. 50%

A. not the result of the yield calculation.

B. moles of 1-propanol = 10/60 = 0.1667 mol; theoretical mass of 1-bromopropane (M = 123) = 0.1667 × 123 = 20.5 g; % yield = 12/20.5 × 100 = 58.5% ≈ 58%.

C. not the result of the yield calculation.

D. not the result of the yield calculation. (Key: Chemistry Q48 = B.)

Question 211 Chemistry

Which one of the following has same number of molecules as present in 11g of CO_2:

- A. 4g of O_2
- B. 4.5g of H_2O ✓ **Correct answer**
- C. 4g of Cl
- D. 1/4 moles of NaCl

A. 4/32 = 0.125 mol, but 11 g CO_2 is 11/44 = 0.25 mol.

B. 4.5/18 = 0.25 mol, the same as 11 g CO_2 (0.25 mol), so it has the same number of molecules.

C. 4/35.5 = 0.113 mol, not 0.25 mol.

D. 1/4 mol is 0.25 mol, but NaCl is ionic (it exists as formula units in a lattice, not as molecules), so it does not have "molecules". (Key: Chemistry Q49 = B.)

212 Chemistry

An organic sample consisting of carbon, hydrogen and oxygen was subjected to combustion analysis. 0.543g of this compound gave 1.039g of Carbon dioxide, 0.636g of water vapours. The empirical formula of this compound is:

- A. CH_2O
- B. $C_4H_{12}O_2$
- C. C_3H_6O
- D. CH_4O

No answer is given for this question, and none is taught. NO CORRECT OPTION — DEFECTIVE-excluded (decided by assistant under owner's 8 Nov 2026 delegation)

A. the C:H:O ratio is 2:6:1, not 1:2:1.

B. this has the right ratio (4:12:2 = 2:6:1) but it is NOT the empirical formula (the simplest ratio is C_2H_6O).

C. this is the printed key, but its ratio (3:6:1) does not match the data.

D. the C:H:O ratio is 2:6:1, not 1:4:1. From the data: C = 1.039×(12/44) = 0.283 g (0.0236 mol), H = 0.636×(2/18) = 0.0707 g (0.0707 mol), O = 0.543−0.283−0.0707 = 0.189 g (0.0118 mol); the mole ratio C:H:O = 2:6:1, so the empirical formula is C_2H_6O, which is NOT among the options. (Key: Chemistry Q50 = C — the key is wrong; its ratio (3:6:1) contradicts the combustion data.)

Question 213 Chemistry

28g of N_2 will at STP occupy the volume of:

- A. 22.41 dm^3 ✓ **Correct answer**
- B. 44.82 dm^3
- C. 44.82 cm^3
- D. 2.241 dm^3

1 mol, and 1 mol of any gas at STP occupies 22.41 dm^3.

B. that would be the volume of 2 mol (56 g) of N_2.

C. far too small (and the wrong unit scale).

D. that would be the volume of 0.1 mol (2.8 g) of N_2. (Key: Chemistry Q51 = A.)

Question 214 Chemistry

Study the following graphs of boiling points of some substances. Which of the above graph shows that some members of graph have hydrogen bonding:

- A. I + IV
- B. II + IV
- C. III + IV + V ✓ **Correct answer**
- D. I + II + III

A. graph I (noble gases) shows a smooth increase with no hydrogen bonding, so I is not one of the hydrogen-bonded graphs.

B. graph II (hydrocarbons) shows a smooth increase with no hydrogen bonding, so II is not one of them.

C. graph III (Group V hydrides: NH_3 is anomalously high), graph IV (Group VI hydrides: H_2O is anomalously high) and graph V (Group VII hydrides: HF is anomalously high) all show the first member with a much higher boiling point than the trend — the signature of hydrogen bonding (in NH_3, H_2O and HF).

D. graphs I and II show no hydrogen bonding. (Key: Chemistry Q52 = C. The paper prints five boiling-point graphs labelled I–V: I = noble gases (He, Ne, Ar, Kr), II = hydrocarbons (CH_4, C_2H_6, C_3H_8, C_4H_{10}), III = Group V hydrides (NH_3, PH_3, AsH_3, SbH_3), IV = Group VI hydrides (H_2O, H_2S, H_2Se, H_2Te), V = Group VII hydrides (HF, HCl, HBr, HI); the options are the graph combinations, described here as filed.)

215 Chemistry

No of electrons in $_{31}^{69}Ga^{3+}$ will be:

- A. 28 ✓ **Correct answer**
- B. 29
- C. 30
- D. 34

A. gallium (Z = 31) has 31 electrons as an atom; the Ga^{3+} ion has lost 3 electrons, so it has 31 − 3 = 28 electrons.

B. that would be Ga^{2+}, not Ga^{3+}.

C. that would be Ga^{1+}, not Ga^{3+}.

D. that is the number of neutrons (69 − 31 = 38 is wrong; 34 is neither the electron nor the neutron count — the neutron count is 69 − 31 = 38). (Key: Chemistry Q53 = A.)

Question 216 Chemistry

Isotopic symbol of ion of sulphur-33 is $_{16}^{33}S^{-2}$. How many no of protons and neutrons are present if the number of electrons are 18:

- A. P = 18, n = 15
- B. P = 16, n = 17 ✓ **Correct answer**
- C. P = 16, n = 16
- D. P = 17, n = 16

A. sulphur's atomic number is 16, not 18 (18 is the electron count of the S^{2-} ion).

B. the atomic number (lower left) is 16, so there are 16 protons; the mass number is 33, so neutrons = 33 − 16 = 17.

C. neutrons are 33 − 16 = 17, not 16.

D. sulphur's atomic number is 16, not 17 (17 is chlorine). (Key: Chemistry Q54 = B. The ion

as 10 + 2 = 18 electrons, consistent with the stem.)

Question 217

No answer is given for this question, and none is taught. The question is illegible in this source — the text layer prints it as a row of X's and the official key marks it X. parhaikrlo.com confirms the last 4 Chemistry questions (Q217–Q220) were illegible in every copy of the original paper checked. Unrecoverable — no answer asserted. Decided by assistant under owner's 8 Nov 2026 delegation.

Question 218

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Question 219

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Question 220

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