ANSWERS & MARK SCHEMES

QUESTIONSHEET 1

Kingdom	Features	Examples
Fungi	eukaryotic heterotrophic consists of hyphae chitinous cell walls ;	mushrooms Penicillium Mucor ;
Protoctista	eukaryotic heterotrophic (some) autotrophic (some) unicellular or groups of similar cells ;	Amoeba green algae malarial parasite ;
Plantae	eukaryotic autotrophic multicellular cellulosic cell walls ;	moss ferns dicotyledons ;
Animalia	eukaryotic heterotrophic multicellular have nervous coordination ;	tape worm spider frog ;

(a) 1 mark per box with three correct features and no incorrect features. **4**

(b) 1 mark per box with two correct examples and no incorrect example. **4**

TOTAL 8

QUESTIONSHEET 2

There are numerous ways of doing the key. The following is an example only.

1. insect has 1 pair of wings	go to 3
2. insect has 2 pairs of wings	go to 5
3. abdomen has 4 segments	Species A
4. abdomen has 7 segments	Species B
5. antennae clubbed	Species D
6. antennae not clubbed	got to 7
7. wings small in area relative to body	go to 9
8. wings much larger than body	Species E
9. abdomen/body is thin	Species F
10 abdomen/body is thick	Species C

Use of a truly <u>dichotomous</u> key; **1**

1 mark per species correctly separated;;;;;; **6**

TOTAL 7

QUESTIONSHEET 3

1.	leaves simple/not divided	go to 3
2.	leaves compound/divided into leaflets	go to 11
3.	leaves spear/lance shaped/isobilateral.	go to 5
4.	leaves with broad lamina/dorsi-ventral	go to 7
5.	leaf rolled/curled	leaf D
6.	leaf flat	leaf C
7.	leaf with smooth margin	leaf E
8.	leaf with shaped margin	go to 9
9.	margin lobed	leaf A
10.	margin serrated	leaf F
11.	leaflets all arise from tip of petiole	leaf G
12.	leaflets arise along side of petiole	go to 13
13.	leaflets arise opposite to each other.	leaf B
14.	leaflets arise alternately/not opposite	leaf H

Allow one mark for each leaf correctly separated;;;;;;;; **8**
Allow one mark for a correct dichotomous key; **1**

Accept alternative keys if correct and alternative wordings if clear.

TOTAL 9

QUESTIONSHEET 4

(a) (i) all possess jointed legs; **1**

(ii)

Insecta	Crustacea	Arachnida	Chilopoda (Myriapoda)
head louse bee wax moth crane fly ;		harvestman spider ;	centipede ;

3

(b) 1.	organism has wings	go to 3
2.	organism wingless	go to 7
3.	organism with one pair of wings	crane fly
4.	organism with two pairs of wings	go to 5
5.	wings smaller than body/short antennae	bee
6.	wings larger than body/long antennae	wax moth
7.	has three pairs of legs	head louse
8.	has more than three pairs of legs	go to 9
9.	has many legs	centipede
10.	has four pairs of legs	go to 11
11.	body in one part	harvestman
12.	body in two parts	spider

1 mark per organism correctly identified;;;;;;; **7**
1 mark for correct dichotomy; **1**

TOTAL 12

QUESTIONSHEET 5

(a) (i) Kingdom - Phylum - Class - Order - Family - Genus - Species; **1**

(ii) fungi are saprophytic/non-photosynthetic, plantae are photosynthetic;
fungal cell/hyphae walls do not contain cellulose, plant cell walls do;
fungi do not contain chlorophylls, plant cells do;
fungi have multinucleate hyphae, plants have cells with single nuclei; **max 2**

(iii) protoctista have nuclear membranes, prokaryotae do not;
protoctista have chromosomes, prokaryotae have a single chromosome/ nuclear mass;
protoctista have membrane bound organelles/mitochondria or other example, prokaryotae do not; **max 2**

(b) (i) body in three parts/head + thorax + abdomen;
three pairs of legs;
compound eyes;
one pair of antennae;
thorax has three segments;
any other valid feature; **max 3**

(ii) A has two pairs of wings, C has one pair and B is wingless;
A has a very narrow 'waist', C has a thicker 'waist' and B has no 'waist';
A has a long sting/ovipositor, C has a short sting/ovipositor and B does not have one; **max 2**

(c) (i) a flea; **1**

(ii) elongated/powerful back legs for jumping; **1**

(iii) plague/bubonic plague; **1**

TOTAL 13

QUESTIONSHEET 6

(a) (i) A = plasma membrane; B = cell wall; C = nuclear mass; D = mesosome; E = ribosomes; **5**

(ii) contain the enzymes for respiration/cell wall synthesis; **1**

(iii) coccus; **1**

(b) (i) prokaryotic cells contain no membrane-bound organelles, eukaryotes do;
prokaryote cells have no nuclear membrane, eukaryotes do/prokaryotes have a nuclear mass, eukaryotes have a nucleus/prokaryotes have one long chromosome, eukaryotes have many chromosomes;
prokaryotes have no nucleoli, eukaryotes do;
prokaryotic cell walls contain murein, eukaryotic cell walls (if present) contain cellulose; **max 3**

(ii) Nostoc is prokaryotic but algae are eukaryotic; **1**

(iii) in the cytoplasm/in vesicles/in chromatophores; **1**

TOTAL 12

QUESTIONSHEET 7

Feature	Viruses	Bacteria	Algae	Protozoa	
Cannot reproduce independently	✓	✗	✗	✗	;
Are heterotrophic	✗	✓	✗	✓	;
Can cause diseases	✓	✓	✗	✓	;
Contain DNA or RNA but not both	✓	✗	✗	✗	;
Can photosynthesise	✗	✓ (some species can)	✓	✗	; **5**

TOTAL 5

QUESTIONSHEET 8

(a) (i) A = radial; B = bilateral; C = radial; D = radial; E = bilateral; F = bilateral; **6**

(ii) can receive/obtain food (with equal ease) from any direction;
can receive sperm/gametes (with equal ease) from any direction;
can receive stimuli from all directions/has 'all round' awareness; **max 2**

(iii) has an equal chance of receiving/attracting an insect from any direction;
can shed seeds/fruits equally well in all directions; **max 1**

(b) (i) has jointed legs; **1**

(ii) body in three parts/head, thorax, abdomen;
has compound eyes;
has 1 pair of antennae;
has three pairs of legs; (reject wings, some insects are wingless) **max 2**

(c) (i) webbed (hind) feet;
moist skin/skin used as respiratory surface;
must return to water to breed;
has an aquatic tadpole larva; **max 2**

(ii) nectar (to attract insects);
coloured/red/white (to attract insects);
petals/corolla provides a landing stage (for insects); **max 2**

TOTAL 16

QUESTIONSHEET 9

(a) (i) some lengths of DNA strands will not have complementary bases;
thus will not be joined by hydrogen bonds/double helix held together by fewer hydrogen bonds;
thus less energy required to split strands apart; **max 2**

(ii) the further subspecies diverge the more discepancies occur between complementary bases;
thus fewer hydrogen bonds anchor the DNA strands in hybrid DNA of distant subspecies; **max 2**

(iii) greatest differences in separation temperatures of Nigerian group and other three subspecies;
suggesting that they are fairly divergent groups/Nigerian group may be a separate subspecies;
Nigerian group is probably genetically closest to Pan troglodytes verus;
Pan troglodytes troglodytes is probably closest to Pan troglodytes schweinfurthei;
(accept any other reasonable comments) **max 3**

(b) (i) whether DNA fingerprints of different organisms show corresponding dark bands;
these indicate matching/corresponding base/nucleotide sequences;
ref to visualisation by radioactive gene probes, labelled sequences show up as dark bands on film; **max 2**

(ii) 1.Pan troglodytes troglodytes and Pan troglodytes schweinfurthei;
2. Pan troglodytes schweinfurthei and the Nigerian group; **2**

TOTAL 11

QUESTIONSHEET 10

(a) (i) has nervous coordination;
is non-photosynthetic/heterotrophic; **2**

(ii) has a notochord;
has a dorsal hollow nerve cord;
has visceral clefts;
has a post-anal tail; **max 2**

(iii) has skin with hair in follicles;
viviparous/has gestation periods/young born from uterus;
has mammary glands/young fed on milk; **max 2**

(iv) only eats meat/ref to dentition; **1**

(b) (i) dog family/Canidae/bear family/Ursidae/any other correct example; **1**

(ii) Leo/lion genus/Felis/domestic cat genus/any other correct example; **1**

(c) the classification represents the evolutionary history/evolutionary affinities of organisms;
the closer two types of organisms are in the classification the closer their evolutionary relationship;
2

TOTAL 11

QUESTIONSHEET 11

(a) tapeworms are parasites inside gut/other organs/endoparasites;
hooks and suckers enable their heads to attach (strongly) to host organs; **2**

(b) 1.	head with no hooks/suckers only	go to 3
2.	head with hooks and suckers	go to 5
3.	head with two simple suckers	species A
4.	head with four leaf like suckers (and four simple suckers)	species D
5.	head with one row of hooks	go to 7
6.	head with more than one row of hooks	go to 9
7.	hooks small, three large suckers visible/four large suckers	species E
8.	hooks large, two small suckers and two large suckers visible	species C
9.	two rows of small hooks, three large suckers visible/four large suckers	species B
10.	two groups of hooks on head, many hooks on 'neck', two large suckers	species F

1 mark for each correct identification = 6 marks;;;;;;
1 mark for a correct dichotomous key; **7**

TOTAL 9

QUESTIONSHEET 12

(a) lack nuclear membranes/organised nuclei;
lack membrane bound organelles;
lack 9 + 2 microtubule organelles; **max 2**

(b) have multinucleate hyphae;
no cellulose in walls/have chitin rather than cellulose;
heterotrophic nutrition by direct absorption/extracellular digestion;
have spores without flagella; **max 2**

(c) cell walls contain cellulose;
multicellular photosynthetic eukaryotes; **2**

(d) monocotyledons have only one seed leaf, dicotyledons have two;
monocotyledons have leaves with parallel veins, dicotyledons have leaves which are net-veined;
monocotyledons have floral parts in threes, dicotyledons have floral parts in fives (usually) **max 2**

(b) all contain a notochord (at some stage);
all have a dorsal, hollow nerve cord;
all have visceral clefts;
all have a post-anal tail; **max 2**

(c) all have skin with hair follicles;
all are viviparous/young born from uterus/have pregnancies;
young are fed on milk/have mammary glands/suckle young; **max 2**

TOTAL 12