3.10 Biology: Plants, Ecology and Health: 1-hour Pack

ISEB Common Entrance Biology (13+) · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 5 quadrats, each of area 1 m², are placed at random in a field. The numbers of snails counted are 10, 7, 6, 8, 9. Calculate the mean number per m2.

- ☐ A) 0.8 per m2
- ☐ B) 80 per m2
- ☐ C) 8 per m2
- ☐ D) 40 per m2
- ☐ E) 10 per m2

---

2 Which part of the skeleton protects the spinal cord?

- ☐ A) skull
- ☐ B) femur
- ☐ C) pelvis
- ☐ D) vertebrae
- ☐ E) ribs

---

3 In the food chain wheat -> vole -> kestrel, which organism is the primary consumer?

- ☐ A) grasshopper
- ☐ B) vole
- ☐ C) robin
- ☐ D) minnow
- ☐ E) sparrowhawk

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4 What is the main job of the ovule in a flower?

- [ ] A) holding up the anther
- [ ] B) attracting insects
- [ ] C) containing the ovules and developing into the fruit
- [ ] D) protecting the flower bud
- [ ] E) containing the female gamete and becoming the seed after fertilisation

---

5 Which group of animals have eight legs and two body sections?

- [ ] A) molluscs
- [ ] B) insects
- [ ] C) arachnids
- [ ] D) annelids (segmented worms)
- [ ] E) crustaceans

---

6 Which of these animals is one of the insects?

- [ ] A) ant
- [ ] B) lobster
- [ ] C) ragworm
- [ ] D) leech
- [ ] E) shrimp

---

7 Which group of animals have hair or fur and feed their young on milk?

- [ ] A) amphibians
- [ ] B) reptiles
- [ ] C) mammals
- [ ] D) fish
- [ ] E) birds

---

8 To which group of vertebrates does a herring belong?

- [ ] A) fish
- [ ] B) amphibians
- [ ] C) reptiles
- [ ] D) birds
- [ ] E) mammals

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9 A meadow contains clover with a total energy content of 12,000 kJ. The rabbits that eat this clover contain a total of 1,200 kJ of energy. Calculate the percentage of energy transferred from the clover to the rabbits.

(1)

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10 In a pond, grass stores 1000 kJ of energy and the rabbits that eat it store 120 kJ. Calculate the percentage of energy transferred from the grass to the rabbits.

- ☐ A) 880%
- ☐ B) 88%
- ☐ C) 120%
- ☐ D) 0.12%
- ☐ E) 12%

---

11 5 quadrats, each of area 1 m^2, are placed at random in a field of area 500 m^2. The numbers of snails counted are 9, 6, 7, 10, 8. Estimate the total number of snails in the field.

- ☐ A) 400
- ☐ B) 4000
- ☐ C) 8
- ☐ D) 20000
- ☐ E) 40000

---

12 What do we call all the members of one species living in a habitat?

- ☐ A) habitat
- ☐ B) ecosystem
- ☐ C) community
- ☐ D) population
- ☐ E) species

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13 In the food chain oak leaf -> caterpillar -> wren -> sparrowhawk, what does the arrow show?

- [ ] A) which organism is bigger
- [ ] B) the direction the animals move
- [ ] C) which organisms compete
- [ ] D) what each organism lives in
- [ ] E) the direction of energy flow

---

14 What is the main job of the petals in a flower?

- [ ] A) making pollen
- [ ] B) attracting insects
- [ ] C) holding up the anther
- [ ] D) protecting the flower bud
- [ ] E) containing the ovules and developing into the fruit

---

15 Which group of animals have a soft, segmented body and no legs?

- [ ] A) molluscs
- [ ] B) arachnids
- [ ] C) annelids (segmented worms)
- [ ] D) insects
- [ ] E) crustaceans

---

16 To which group of invertebrates does a mite belong?

- [ ] A) annelids (segmented worms)
- [ ] B) crustaceans
- [ ] C) insects
- [ ] D) arachnids
- [ ] E) molluscs

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17 Sort each of the following human features into one of these groups: 'caused only by genes', 'caused only by the environment', or 'caused by both genes and the environment'.

1) Blood group
2) A tattoo
3) Height
4) A scar from an injury

(4)

---

18 What are the main features of mammals?

- [ ] A) have hair or fur and feed their young on milk
- [ ] B) have feathers and wings and lay hard-shelled eggs
- [ ] C) have gills and scales and live in water
- [ ] D) have moist skin and lay their eggs in water
- [ ] E) have dry, scaly skin and lay eggs with leathery shells

---

19 To which group of vertebrates does a human belong?

- [ ] A) amphibians
- [ ] B) birds
- [ ] C) reptiles
- [ ] D) fish
- [ ] E) mammals

---

20 Rotting logs in a forest do not accumulate indefinitely on the forest floor. Name the group of organisms mainly responsible for breaking down dead wood and plant matter.

(1)

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21 In a woodland, grass stores 10000 kJ of energy and the rabbits that eat it store 1000 kJ. Calculate the percentage of energy transferred from the grass to the rabbits.

- [ ] A) 1000%
- [ ] B) 0.1%
- [ ] C) 10%
- [ ] D) 90%
- [ ] E) 9000%

---

22 5 quadrats, each of area 1 m^2, are placed at random in a field of area 200 m^2. The numbers of dandelions counted are 4, 2, 5, 1, 3. Estimate the total number of dandelions in the field.

- [ ] A) 600
- [ ] B) 60
- [ ] C) 3
- [ ] D) 3000
- [ ] E) 6000

---

23 In the food chain grass -> rabbit -> fox, which organism is the producer?

- [ ] A) caterpillar
- [ ] B) greenfly
- [ ] C) minnow
- [ ] D) grass
- [ ] E) mouse

---

24 What is the main job of the ovary in a flower?

- [ ] A) attracting insects
- [ ] B) making pollen
- [ ] C) containing the ovules and developing into the fruit
- [ ] D) receiving pollen
- [ ] E) containing the female gamete and becoming the seed after fertilisation

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25 Which group of animals have a hard outer shell and more than four pairs of legs?

- ☐ A) crustaceans
- ☐ B) annelids (segmented worms)
- ☐ C) insects
- ☐ D) arachnids
- ☐ E) molluscs

---

26 Which of these animals is one of the reptiles?

- ☐ A) salamander
- ☐ B) dog
- ☐ C) cod
- ☐ D) eagle
- ☐ E) turtle

---

27 Sophie is a 12-year-old girl who needs approximately 1,830 kcal per day. Her energy intake on one day totals 1920 kcal. Calculate the difference between her energy intake and her energy requirement, and state whether she is in energy balance, surplus or deficit.

(1)

---

28 In a woodland, the producers in a food chain store 50000 kJ of energy. 10% of this energy is passed to the primary consumers. Calculate the energy passed on in kJ.

- ☐ A) 45000 kJ
- ☐ B) 50000 kJ
- ☐ C) 500000 kJ
- ☐ D) 5000 kJ
- ☐ E) 500 kJ

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29 5 quadrats, each of area 1 m², are placed at random in a field of area 200 m². The numbers of clover plants counted are 10, 11, 13, 12, 14. Estimate the total number of clover plants in the field.

- [ ] A) 12
- [ ] B) 2400
- [ ] C) 12000
- [ ] D) 24000
- [ ] E) 240

---

30 What word describes an animal that hunts and eats other animals?

- [ ] A) decomposer
- [ ] B) producer
- [ ] C) predator
- [ ] D) prey
- [ ] E) scavenger

---

31 In the food chain rose bush -> greenfly -> wren -> cat, what does the arrow show?

- [ ] A) what each organism lives in
- [ ] B) which organism is bigger
- [ ] C) the direction the animals move
- [ ] D) which organisms compete
- [ ] E) the direction of energy flow

---

32 Which part of a flower is responsible for attracting insects?

- [ ] A) style
- [ ] B) ovule
- [ ] C) ovary
- [ ] D) petals
- [ ] E) filament

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33 Which of these animals is one of the molluscs?

- [ ] A) snail
- [ ] B) ragworm
- [ ] C) butterfly
- [ ] D) housefly
- [ ] E) woodlouse

---

34 What are the main features of reptiles?

- [ ] A) have hair or fur and feed their young on milk
- [ ] B) have dry, scaly skin and lay eggs with leathery shells
- [ ] C) have gills and scales and live in water
- [ ] D) have moist skin and lay their eggs in water
- [ ] E) have feathers and wings and lay hard-shelled eggs

---

35 In the food chain grass -> grasshopper -> frog -> heron, which organism is the producer?

- [ ] A) grass
- [ ] B) slug
- [ ] C) fox
- [ ] D) tadpole
- [ ] E) trout

---

36 Which part of a flower is responsible for making pollen?

- [ ] A) style
- [ ] B) ovule
- [ ] C) petals
- [ ] D) sepals
- [ ] E) anther

---

37 To which group of invertebrates does a beetle belong?

- [ ] A) annelids (segmented worms)
- [ ] B) crustaceans
- [ ] C) insects
- [ ] D) arachnids
- [ ] E) molluscs

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38 Which of these animals is one of the birds?

- ☐ A) cod
- ☐ B) human
- ☐ C) horse
- ☐ D) owl
- ☐ E) cow

---

39 A school recorded the dietary preferences of 200 students: vegetarian = 30, vegan = 10, omnivorous = 160. Calculate the percentage of vegan students.

(1)

---

40 In a coral reef, the producers in a food chain store 10000 kJ of energy. 5% of this energy is passed to the primary consumers. Calculate the energy passed on in kJ.

- ☐ A) 50000 kJ
- ☐ B) 500 kJ
- ☐ C) 9500 kJ
- ☐ D) 5000 kJ
- ☐ E) 2000 kJ

---

41 5 quadrats, each of area 1 m^2, are placed at random in a field of area 2000 m^2. The numbers of clover plants counted are 8, 7, 4, 6, 5. Estimate the total number of clover plants in the field.

- ☐ A) 120000
- ☐ B) 12000
- ☐ C) 6
- ☐ D) 1200
- ☐ E) 60000

---

42 Which type of joint is found at the shoulder and the hip?

- ☐ A) fixed joint
- ☐ B) hinge joint
- ☐ C) pivot joint
- ☐ D) ball and socket joint
- ☐ E) gliding joint

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43 In the food chain grass -> zebra -> lion, which organism is the primary consumer?

- ☐ A) penguin
- ☐ B) heron
- ☐ C) zebra
- ☐ D) frog
- ☐ E) fox

---

44 What is the main job of the filament in a flower?

- ☐ A) containing the female gamete and becoming the seed after fertilisation
- ☐ B) receiving pollen
- ☐ C) protecting the flower bud
- ☐ D) attracting insects
- ☐ E) holding up the anther

---

45 Which of these animals is NOT one of the molluscs?

- ☐ A) bee
- ☐ B) slug
- ☐ C) squid
- ☐ D) snail
- ☐ E) mussel

---

46 Which of these animals is one of the mammals?

- ☐ A) goldfish
- ☐ B) turtle
- ☐ C) horse
- ☐ D) frog
- ☐ E) lizard

---

47 Name one nutrient (other than calcium) that is essential for maintaining the structural integrity of the skeleton.

(1)

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48 In a woodland, grass stores 50000 kJ of energy and the rabbits that eat it store 5000 kJ. Calculate the percentage of energy transferred from the grass to the rabbits.

- [ ] A) 45000%
- [ ] B) 1000%
- [ ] C) 90%
- [ ] D) 0.1%
- [ ] E) 10%

---

49 5 quadrats, each of area 1 m^2, are placed at random in a field of area 500 m^2. The numbers of daisies counted are 9, 8, 6, 7, 5. Estimate the total number of daisies in the field.

- [ ] A) 7
- [ ] B) 3500
- [ ] C) 35000
- [ ] D) 17500
- [ ] E) 350

---

50 What word describes a living thing that makes its own food?

- [ ] A) producer
- [ ] B) parasite
- [ ] C) consumer
- [ ] D) scavenger
- [ ] E) decomposer

---

51 Which part of a flower is responsible for protecting the flower bud?

- [ ] A) anther
- [ ] B) petals
- [ ] C) filament
- [ ] D) style
- [ ] E) sepals

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52 Which of these animals is one of the crustaceans?

- ☐ A) mite
- ☐ B) shrimp
- ☐ C) scorpion
- ☐ D) bee
- ☐ E) beetle

---

53 To which group of vertebrates does a turtle belong?

- ☐ A) reptiles
- ☐ B) amphibians
- ☐ C) fish
- ☐ D) mammals
- ☐ E) birds

---

54 Name one nutrient (other than protein) that is important for strong, healthy muscles.

(1)

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55 A food chain is: plant, herbivore, carnivore. The plants store 8000 kJ. 5% passes to the herbivores and 10% of that passes to the carnivores. Calculate the energy stored by the carnivores in kJ.

- ☐ A) 800 kJ
- ☐ B) 4000 kJ
- ☐ C) 400 kJ
- ☐ D) 40 kJ
- ☐ E) 1200 kJ

---

56 A balanced diet contains several nutrients, each with an important role in the body.

(a) Complete the table below. **(5)**

Carbohydrate - main function: _____
Protein - main function: _____
Fat - main function: _____
Vitamin C - main function: _____ ; deficiency disease: _____

(b) Name one nutrient (other than vitamin C) that is important for strong, healthy bones and teeth. **(1)**

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Mark scheme · 3.10 Biology: Plants, Ecology and Health: 1-hour Pack

Question 1

C (8 per m2) **B1**

Answer: C) 8 per m2

Question 2

D (vertebrae) **B1**

Answer: D) vertebrae

Question 3

B (vole) **B1**

Answer: B) vole

Question 4

E (containing the female gamete and becoming the seed after fertilisation) **B1**

Answer: E) containing the female gamete and becoming the seed after fertilisation

Question 5

C (arachnids) **B1**

Answer: C) arachnids

Question 6

A (ant) **B1**

Answer: A) ant

Question 7

C (mammals) **B1**

Answer: C) mammals

Question 8

A (fish) **B1**

Answer: A) fish

Question 9

10% (oe) **B1**

Answer: 10%

Question 10

E (12%) **B1**

Answer: E) 12%

Question 11

B (4000) **B1**

Answer: B) 4000

Question 12

D (population) **B1**

Answer: D) population

Question 13

E (the direction of energy flow) **B1**

Answer: E) the direction of energy flow

Question 14

B (attracting insects) **B1**

Answer: B) attracting insects

Question 15

C (annelids (segmented worms)) **B1**

Answer: C) annelids (segmented worms)

Question 16

D (arachnids) **B1**

Answer: D) arachnids

Question 17

blood group = genes only **B1**

tattoo = environment only **B1**

height = both genes and environment **B1**

scar = environment only **B1**

Answer: Blood group: genes only. Tattoo: environment only. Height: both. Scar: environment only.

Question 18

A (have hair or fur and feed their young on milk) **B1**

Answer: A) have hair or fur and feed their young on milk

Question 19

E (mammals) **B1**

Answer: E) mammals

Question 20

Decomposers (bacteria and fungi) (oe) **B1**

Answer: Decomposers (bacteria and fungi)

Question 21

C (10%) **B1**

Answer: C) 10%

Question 22

A (600) **B1**

Answer: A) 600

Question 23

D (grass) **B1**

Answer: D) grass

Question 24

C (containing the ovules and developing into the fruit) **B1**

Answer: C) containing the ovules and developing into the fruit

Question 25

A (crustaceans) **B1**

Answer: A) crustaceans

Question 26

E (turtle) **B1**

Answer: E) turtle

Question 27

90 kcal surplus (oe) **B1**

Answer: 90 kcal surplus

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Question 28

D (5000 kJ) **B1**

Answer: D) 5000 kJ

Question 29

B (2400) **B1**

Answer: B) 2400

Question 30

C (predator) **B1**

Answer: C) predator

Question 31

E (the direction of energy flow) **B1**

Answer: E) the direction of energy flow

Question 32

D (petals) **B1**

Answer: D) petals

Question 33

A (snail) **B1**

Answer: A) snail

Question 34

B (have dry, scaly skin and lay eggs with leathery shells) **B1**

Answer: B) have dry, scaly skin and lay eggs with leathery shells

Question 35

A (grass) **B1**

Answer: A) grass

Question 36

E (anther) **B1**

Answer: E) anther

Question 37

C (insects) **B1**

Answer: C) insects

Question 38

D (owl) **B1**

Answer: D) owl

Question 39

5% (oe) **B1**

Answer: 5%

Question 40

B (500 kJ) **B1**

Answer: B) 500 kJ

Question 41

B (12000) **B1**

Answer: B) 12000

Question 42

D (ball and socket joint) **B1**

Answer: D) ball and socket joint

Question 43

C (zebra) **B1**

Answer: C) zebra

Question 44

E (holding up the anther) **B1**

Answer: E) holding up the anther

Question 45

A (bee) **B1**

Answer: A) bee

Question 46

C (horse) **B1**

Answer: C) horse

Question 47

Vitamin D (or phosphorus) (oe) **B1**

Answer: Vitamin D (or phosphorus)

Question 48

E (10%) **B1**

Answer: E) 10%

Question 49

B (3500) **B1**

Answer: B) 3500

Question 50

A (producer) **B1**

Answer: A) producer

Question 51

E (sepals) **B1**

Answer: E) sepals

Question 52

B (shrimp) **B1**

Answer: B) shrimp

Question 53

A (reptiles) **B1**

Answer: A) reptiles

Question 54

Calcium (or iron) (oe) **B1**

Answer: Calcium (or iron)

Question 55

D (40 kJ) **B1**

Answer: D) 40 kJ

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Question 56

(a) carbohydrate: provides energy **B1**

(a) protein: growth and repair of cells/tissues **B1**

(a) fat: energy store, and/or insulation **B1**

(a) vitamin C: helps make/maintain healthy skin and connective tissue oe **B1**

(a) vitamin C deficiency disease: scurvy **B1**

(a) Answer: Carbohydrate: energy. Protein: growth and repair. Fat: energy store/insulation. Vitamin C: healthy skin/connective tissue - deficiency causes scurvy.

(b) calcium (accept vitamin D) **B1**

(b) Answer: Calcium (or vitamin D).

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