NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, APPLIED SCIENCES AND NATURAL RESOURCES

DEPARTMENT OF NATURAL AND APPLIED SCIENCES

QUALIFICATION: BACHELOR OF SCIENCE	
QUALIFICATION CODE: 07BOSC	**LEVEL:** 6
COURSE CODE: PSF602S	**COURSE NAME:** PLANT STRUCTURE AND FUNCTION
SESSION: NOVEMBER 2022	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	PROF PERCY CHIMWAMUROMBE

INSTRUCTIONS

1. Write clearly and neatly
2. Number the answers clearly
3. All written work MUST be done in blue or black ink
4. No books, notes and other additional aids are allowed
5. Mark all answers clearly with their respective question numbers
6. Draw diagrams wherever necessary

PERMISSIBLE MATERIALS

None

THIS QUESTION PAPER CONSISTS OF 8 PAGES
(Including this front page)

QUESTION 1:

Multiple choices **[15]**

Each carry one mark

1.1 Pollination by insect is called;
- a) hydrophily
- b) entomophily
- c) anemophily
- d) ornithophily

1.2 Which of the following is NOT a secondary metabolite?
- a) caffeine
- b) morphine
- c) tannin
- d) glucose

1.3 The cytoplasmic continuum connecting neighbouring cells is called the _____.
- a) apoplast
- b) aquaporin
- c) casparian strip
- d) symplast

1.4 Exine layer of pollen grain is made up of;
- a) sporopollenin
- b) pectin
- c) cellulose
- d) pectin and cellulose

1.5 Which layer of microsporangium provides nutrition to the developing pollen grains?
- a) epidermis
- b) endothecium
- c) tapetum
- d) all

1.6 Which of the following is a mechanism of phloem transport in which dissolved sugar is moved by means of a pressure gradient that exists between the source and the sink?
- a) pressure–flow
- b) tension–cohesion
- c) root pressure
- d) active transport of potassium ions into guard cells

1.7 The figure 1 shows a section through a flower;

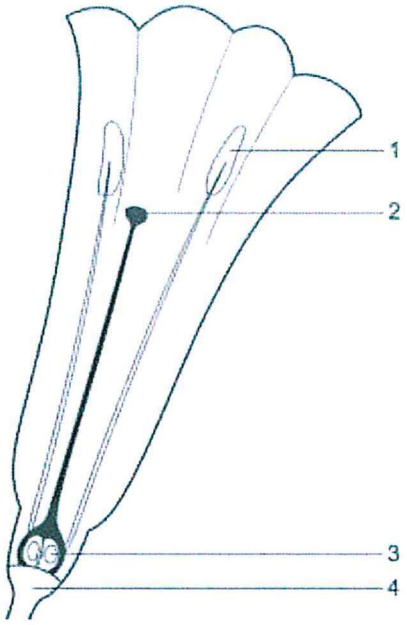


Figure - 1

In figure – 1 which structures are haploid nuclei formed by reduction division?

a) 1 and 3
b) 1 and 4
c) 2 and 3
d) 2 and 4

1.8 By trapping insects, carnivorous plants obtain _____, which they need _____.

a) nitrogen; to make protein
b) sugars; because they cannot produce sufficient amounts by photosynthesis
c) nitrogen; to make sugar
d) phosphorus; to make protein

1.9 Ground tissue is composed of undifferentiated cells with thin walls having storage, photosynthesis and support functions. The inner portion of the ground tissue of a nonwoody stem is called _____ and the outer portion is called _____.

a) cork; cortex
b) pith; cortex
c) pith; cambium
d) cambium; cortex

1.10 What is the difference between a root epidermis and a shoot epidermis?

a) only the shoot epidermis produces a waxy cuticle
b) only the shoot epidermis is replaced by periderm in woody plants
c) the root epidermis has chloroplasts
d) only the root epidermis contains guard cells

1.11 Plant defence against herbivory can be constitutive (always present) or induced (produced in reaction to damage caused by herbivores). Which of the following is an induced defence?

a) production of calcium oxalate
b) the production of an alkaloid
c) deposition of a layer of hardened sclerenchyma tissue
d) releasing compounds to attract parasitoid wasps

1.12 The results of the first mitotic division in a plant zygote are the _____ and the _____.

a) suspensor; endosperm
b) proembryo; terminal cell
c) basal cell; suspensor
d) basal cell; terminal cell

1.13 Many plants cannot be fertilised by pollen from their own flowers. This is known as self-incompatibility. In some species one or two S genes are responsible, each of which may have many different alleles.
If a pollen grain has an S allele which matches an allele in the genotype of the stigma, then the pollen grain fails to germinate, or the pollen tube fails to grow through the style.
Refer to the figure – 2 below, which pollen grains would germinate on the stigma of a flower that only included alleles S3 and S4 of the S gene?

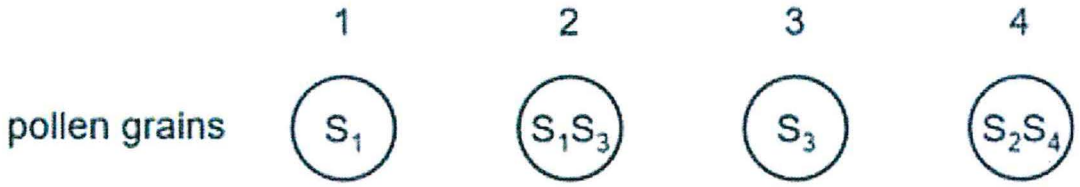


Figure 2

a) 1 only
b) 2 and 4 only
c) 3 only
d) 3 and 4 only

1.14 A branch of plant that grows and bends downwards towards soil, then it grows small roots over surface of soil which then penetrate in soil. This kind of asexual reproduction is known as;

a) tuber
b) runner
c) rooting branch
d) bulb and corms

1.15 Which of the following statements describes the role of *S*-genes in plants?

a) If pollen from another species lands on the stigma of a mustard plant, *S*-genes block the pollen tube growth
b) *S*-genes trigger sexual reproduction in plants that normally reproduce asexually
c) *S*-genes are involved in self-recognition. They prevent self-fertilization in many plants species
d) *S*-genes make plants more resistant to pests (e) *S*-genes are unique to plants and make them more susceptible to manipulation by bioengineers

QUESTION 2:

Distinguish between the pairs of the following terms. **[6]**

Each carry two marks

2.1 Peduncle and pedicle

2.2 Herbaceous plants and woody plants

2.3 Complete and incomplete flower

QUESTION 3:

One sentences answers **[3]**

Each answer carries one mark

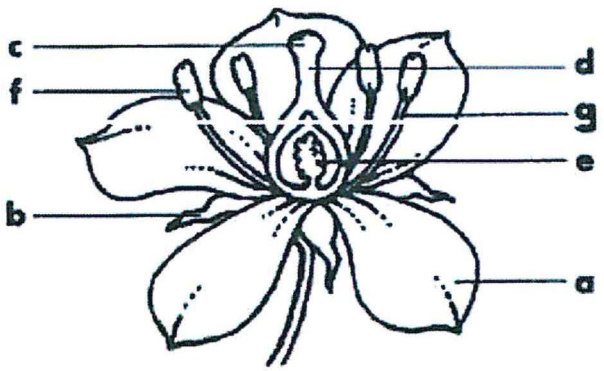


Figure - 3

3.1 Refer to the figure – 3 above. The structure labelled f if they are grouped together is called the _____.

3.2 What is the seat of origin of lateral root and cambium?

QUESTION 4:
Short questions [14]

4.1 Write two observations about the seed in the following picture (figure – 4). (2)

Figure - 4

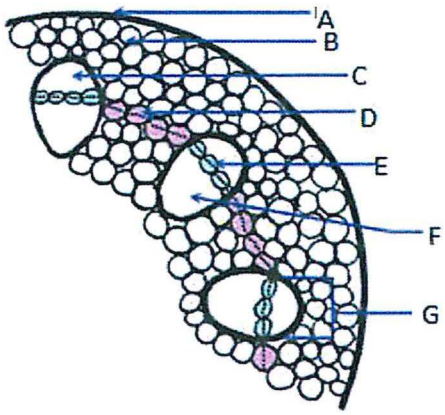
4.2 Write briefly about thigmomorphogenesis. (3)

4.3 Mention some characteristics of water seed dispersed with 3 examples. (3)

4.4 Mention three strategies evolved to prevent self-pollination in flowers. (3)

QUESTION 5: **[18]**
Structures and functions

5.1 Use the diagram to answer each question.



Give the letter that correctly identifies the plant tissues shown in the photograph above.

5.1.1 Refer to the illustration above. Give the letter that correctly identifies the plant tissues shown in the photograph above.

i. Cambial ring ..... (2)
ii. Xylem ..... (1)
iii. Interfascicular cambium..... (1)

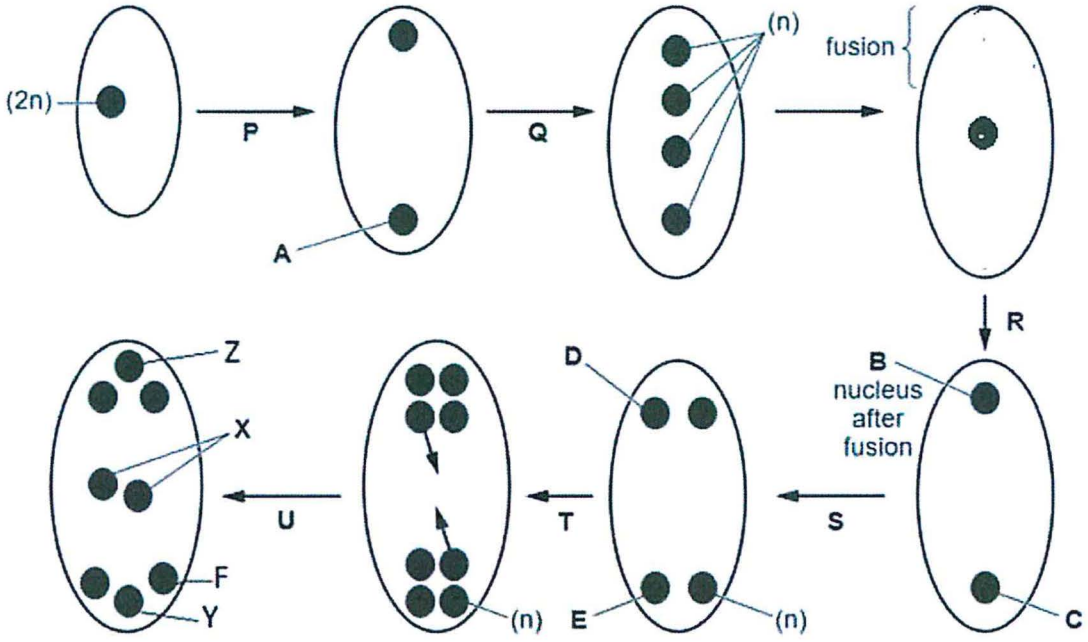
5.1.2 Refer to the illustration above. The tissue labelled B, and C is called as; (2)

5.1.3 The bark on a woody stem is made up of _____ and _____. (2)

5.1.4 The center region of ground tissue in an herbaceous stem is known as the _____. (1)

5.1.5 Which tissue is formed in stems from cells cut off by the cambium on its inner side? (1)

5.2 Use the diagram to answer each question.
The development of the embryo sac in flowering plants involves both mitosis and meiosis. Details of this development can vary in different plants. The diagrams summarise the development of the egg cell within the embryo sac of Lilium sp. Some of the nuclei have been labelled to indicate the ploidy: n = haploid; 2n = diploid.



5.2.1 Which stage or stages, from P, Q, R, S and T, represent meiosis II?
..... (1)

5.2.2 Which nucleus, B, C, D, E X or Y, is the triploid nucleus to be formed?
..... (1)

5.2.3 Which stage or stages, from P, Q, R, S and T, represent mitosis II?
..... (1)

5.2.4 Which nucleus, B, C, D, E, X, Y or Z is the diploid nucleus to be formed?
..... (1)

5.2.5 Which nucleus, B, C, F, X, Y or Z represent haploid nucleus?
..... (2)

5.2.6 Which nucleus, A, B, C, D or E, is the first triploid nucleus to be formed?
..... (2)

QUESTION 6:
Longer questions **[20]**

6.1 Explain any five terms related to the shape of leaf and include a sketch. (7)

6.2 Describe the different stages of germination of starch seeds. (6)

6.3 Explain the chemical communication process involved in establishment of plant partnerships with mycorrhiza fungi and why this is important. (7)

QUESTION 7:
Essay questions **[26]**

7.1 Define and explain the types of dry fruits with examples. (15)

7.2 Discuss the structure and the mechanism of closing of the stomata. (11)

END OF EXAMINATION PAPER