

HONEYBEE BIOLOGY

The Candidate shall be able to describe in detail and illustrate where appropriate, referring to histological features as necessary:-

- 5.1 the alimentary system including the process of digestion by enzymes and the absorption and assimilation of the products of digestion;
- 5.2 the excretory system and the substances excreted;
- 5.3 the respiratory system, including the muscular ventilation of the air sacs, the structure and operation of the spiracles and the exchange of respiratory gases: both at rest and during active flight;
- 5.4 the circulatory system, including the heart, dorsal and ventral diaphragms and the composition and functions of haemolymph;
- 5.5 The exocrine glands of all castes and sexes of adult bees and larvae, the functions and main compositions of their secretions including pheromones, (hypopharyngeal, mandibular, tergite glands of the queen (Renner-Baumann); Nasonov, sting, Arnhart post cerebral, thoracic salivary, wax glands and wax production).
- 5.6 the structure and function of the nervous system and sense organs (including the compound eyes, ocelli, organ of Johnston and the sensilla);
- 5.7 the endocrine glands and the functions of their secretions particularly the neurosecretory cells, the corpora allata, corpora cardiaca and the prothoracic glands;
- 5.8 the fat body and its storage of metabolites;
- 5.9 the reproductive system of queen and drone and the production of sperm and eggs;
- 5.10 the structure of the egg, development of the embryo within the egg and the hatching of the larva;
- 5.11 the external and internal structure of the honeybee larva;
- 5.12 the metamorphosis of the larva with outline accounts of ecdysis, larval defaecation, cocoon spinning, the external anatomy of the pro-pupa, its change to a pupa and then to an imago;
- 5.13 the effect of feeding and other factors on caste determination including discussion about the differences between brood food and royal jelly;
- 5.14 the physiological and structural differences between laying workers and normal workers and the role of pheromones in bringing about these differences;
- 5.15 the differences between summer and winter worker honeybees;
- 5.16 the structure and main constituents of the cuticle with an outline account of its invagination within the body to form linings of the gut and tracheae;
- 5.17 the external anatomy of the queen, worker and drone;
- 5.18 the function and structure of the wings, legs, feet, antennae, mouth parts and setae (hairs);
- 5.19 the structure of the sting mechanism and how this mechanism operates to penetrate human skin and deliver the venom;
- 5.20 the role of the direct and indirect muscles in flight.