Large Animal Paper - Sample Long Answer Question

(a) Outline the key flock and clinical information required to facilitate the laboratory investigation of abortion in a sheep flock (8 marks).

For each of the following causes of abortion in ewes: (i) indicate the causative agent, (ii) the likely clinical history, describe the grossly (iii) and microscopically (iv) visible lesions that might be found, and (v) give details of ancillary tests that should be carried out to confirm the diagnosis.

(b) Enzootic Abortion of Ewes (16 marks)
(c) Toxoplasmosis (11 marks)
(d) Listeriosis (13 marks)

Model answers and marks awarded.

(a) Obtain thorough clinical history to include flock vaccination status (1), replacement ewes introduced (1), supplementary feeding given (1). Number/percentage of ewes that have aborted (1), at what stage of gestation have they aborted (1), were some lambs born alive (1), any deformities in lambs (1), was the ewe clinically unwell at or after the abortion (1)

(b) Enzootic Abortion of Ewes

(i) Causative agent: Chlamydia/Chamydophilia abortus (1)
(ii) Clinical history Late term abortion storms (up to 75%) when newly introduced (1); once enzootic, yearly abortion rates of 5%. Post abortion, ewes may be sick, retain foetal membranes, or develop metritis (1). New sheep introduced previous year (1).
(iii) Gross lesions: cotyledons and intercotyledonary areas (1) - dull-clay/dark-red colour, firm, matted with a dirty-red exudate, leathery thickening (1). Foetus: usually well preserved, few gross lesions (hepatomegaly) (1)
(iv) Microscopic lesions: Cotyledonary and intercotyledonary areas feature necrotic debris on their eroded surfaces (1) with attendant haemorrhage, oedema and infiltrates of neutrophils and macrophages, with fewer lymphocytes (1). Throughout the necrotic debris, the cytoplasm of intact and sloughed trophoblasts often markedly expanded by amphophilic to pale basophilic, homogenous inclusions composed of aggregates of <1 µm cocci (Gram-negative chlamydia cells within cytoplasmic vacuoles) (1). Within chorioallantoic connective tissue, the tunica intima and media of blood vessels feature necrotic debris (1) and infiltrations of neutrophils - necrotising vasculitis (1) with occasionally thrombosed lumens (1).
(v) Ancillary tests: PCR (1), staining of cotyledonary scrapings or histologic sections with modified Ziehl-Neelsen, Gimenez, Machiavello, or Giemsa (1), IHC (1).

(c) Toxoplasmosis

(i) Causative agent: Toxoplasma gondii (1)
(ii) Clinical history 'abortion storm' - up to 30-40% or more of ewes in naïve or unvaccinated flocks (1). Feed contaminated with oocysts (1) – kittens on farm? (1) Depending on when ewes infected

during pregnancy - barren ewes (embryonic resorption), mummified foetuses (1), stillbirths, and weak lambs (1).
(iii) Gross lesions 1-2 mm yellow-white sometimes gritty foci in cotyledons (1). Oedema of intercotyledonary area
(iv) Microscopic lesions: non-suppurative encephalitis and foci of necrosis (1) with tachyzoites. Quiescent protozoal cysts (1). Trophoblast necrosis and mineralisation with tachyzoites.
(v) Ancilliary tests Foetal serology (1) (indirect haemagglutination inhibition, latex agglutination, or fluorescent antibody). IHC on placenta/foetal brain (1)

(d) Listeriosis

(i) Causative agent Listeria monocytogenes (1)
(ii) Flock history sporadic (<10%) (1), late-term abortions, stillbirths, and birth of weak lambs (1). Ingestion of poorly fermented silage (1) – perhaps while housing during wet winter. Rarely metritis/sepsis in aborting ewe (1). Retained placenta (1).
(iii) Gross lesions: foetus often autolytic or mummified (1) as dam aborts up to 2 weeks after foetal death. May see enlarged, bronze-red, friable liver with numerous, 0.5–1 mm in diameter pale yellow foci (1).
(iv) Microscopic lesions: Necrosuppurative placentitis affecting cotyledonary and intercotyledonary areas (1). Gram-positive bacilli fill trophoblasts (1). Multifocal necrotising hepatitis (1) - organism may be visualised (Gram) along with small numbers of degenerate neutrophils and macrophages (1).
(v) Ancillary tests: microbiological culture (1).