

一、寄生蟲學（共 25 題選擇題，每題 1 分，共 25 分）※ 本大題請作答於試卷內「選擇題作答區」。

1. The vector in which the infective organisms undergo development or multiply before being transmitted to the recipient host is: (1) biological vector, (2) mechanical vector.
2. Point out the parasite to be transmitted by *Ctenocephalides canis* or *C. felis*: (1) *Dipylidium caninum*, (2) *Schistosoma japonicum*, (3) *Heterophyes heterophyes*.
3. *Rhipicephalus sanguineus* is a: (1) one-host tick, (2) two-host tick, (3) three-host tick.
4. Tropical canine pancytopenia (*Ehrlichia canis*) can be transmitted by: (1) *Ixodes scapularis*, (2) *Boophilus bigemina*, (3) *Rhipicephalus sanguineus*.
5. The biological vector of Leucocytozoonosis is: (1) *Culicoides* spp., (2) face fly, (3) tsetse fly.
6. The parasitizing habitat of adult *Fasciola hepatica* is in: (1)intestine, (2)liver, (3)kidney
7. The parasitizing habitat of adult *Clonorchis sinensis* is in: (1)intestine, (2)liver, (3)kidney
8. Point out the parasite whose metacercariae inhabit on vegetation: (1)*Heterophyes heterophyes*, (2)*Fasciola hepatica*, (3) *Dicrocoelium dendriticum*
9. Which stage of the *Schistosoma hepaticum* lacks in its life history? (1)cercaria, (2)redia, (3)metacercaria, (4)miracidium
10. Point out the genus of the tapeworm whose scolex has two slitlike grooves: (1)*Spirometra*, (2)*Dipylidium*, (3)*Anoplocephala*, (4)*Taenia*
11. The fluke with the slender female lying in the gynecophoric canal of the male is: (1) *Schistosoma japonicum*, (2) *Alaria canis*, (3) *Eurytrema procyonis*.
12. Nodules on the gut wall of the animals being parasitized by nodular worms are caused by the immune response of hosts against worms: (1)1st-stage larvae, (2)2nd-stage larvae, (3)3rd-stage larvae.
13. Point out the normal host of *Ancylostoma tubaeforme*: (1)dogs, (2)cats, (3)pheasants, (4)humans
14. Point out the genus of the parasite whose males and females are fused permanently in copula: (1)*Oesophagostomum*, (2)*Ancylostoma*, (3)*Syngamus*, (4)*Stephanurus*.
15. The zoonotic *Strongyloides* spp. of dogs in human infection is: (1) *Strongyloides ratti*, (2) *Strongyloides stercoralis*, (3) *Strongyloides ransomi*, (4) *Strongyloides westeri*.
16. *Toxocara vitulorum* is the parasite of: (1)dogs, (2)cats, (3)cattle, (4)pigs
17. Point out the parasite whose larvae can enter the fetus in utero during third trimester of pregnancy: (1)*Toxocara canis*, (2)*Toxocara cati*, (3)*Toxascaris leonina*, (4)*Ascaris suum*
18. Canine piroplasmiasis can be transmitted by: (1) *Ixodes scapularis*, (2) *Boophilus bigemina*, (3) *Rhipicephalus sanguineus*.
19. Point out the etiological agent which causes Surra: (1)*Trypanosoma gambiense*, (2)*Tritrichomonas fetus*, (3) *Trypanosoma evansi*, (4) *Trypanosoma congolense*.
20. The etiological agent of Blackhead is: (1)*Tritrichomonas foetus*; (2)*Trypanosoma evansi*; (3)*Trichomonas gallinae*; (4)*Histomonas meleagridis*.
21. The sporulated oocyst containing 2 sporocysts and 4 sporozoites in each sporocyst is: (1)*Eimeria* spp., (2)*Toxoplasma* spp. (3)*Isospora* spp.
22. "Milk spot" lesions happened on the liver of the pig are usually caused by the: (1)adults, (2)larvae of *Ascaris suum*.
23. Point out the protozoa with the trait of self-limiting in its infection: (1)*Mastigophora*, (2)*Ciliata*, (3)*Sarcodina*, (4)*Coccidia*.
24. Larval development from the second stage to the third stage of canine heartworms occurs in the: (1)salivary glands, (2)Malpighian tubules, (3) midgut, in its intermediate host --- the mosquito.

25. Point out the tapeworm whose larval bladderworm --- the coenurus, usually causes the neurological disorder in its intermediate host: (1)*Taenia taeniaeformis*, (2)*Echinococcus multilocularis*, (3)*Taenia multiceps*, (4)*Moniezia expansa*.

二、細菌學 (5 題問答題，每題 5 分，共 25 分)

1. 請寫出細菌分類的主要依據？及其主要特徵？
2. 實驗室鑑定病原性細菌(pathogenic bacteria)的方法有哪些？並略簡述這些方法的特點？
3. 「antimicrobial agents」的作用方式有哪些？請個別略述之。
4. 試討論 *Streptococcus suis* 感染致病的 virulence factors 及其致病機序(pathogenesis)。
5. 請依所產生的 virulence factors 討論 neonatal *Escherichia coli* 下痢的致病機序。

三、病毒學 (共 25 分)

1. What is a virion, and how is it different from other living organisms? (5 points)
2. Outline the strategies in which viruses used to evade host defenses. (5 points)
3. What is a latent infection? Give an example of animal virus that causes such infection. (5 points)
4. Define the following terms. (10 points)
 - a. virokinase
 - b. reverse transcriptase
 - c. v-onc gene
 - d. inclusion body
 - e. hemagglutinin

四、免疫學 (一題 0.5 分，共 50 題，沒倒扣，共計 25 分)

A. 是非題 (正確請寫 O，錯誤請寫 X)

1. 藥物過敏的原理建立在 hapten-protein carrier 的概念
2. 被抽 AIDS 患者血之針頭刺到，當天測得 Ab 陰性，隔天再測亦陰性，表示沒被感染
3. 一個 Ab 分子可同時有 κ 及 λ chain
4. 一個 B cell 表面上的 mlg 都有相同的 idio type
5. 抗 mouse IgG Fab 的 rabbit Ab 可認識 mouse IgM
6. 抗 mouse J chain 的 rabbit Ab 可認識 mouse IgM
7. 鳥類可使用 gene conversion 以達成 generation of Ig diversity
8. 提高 sensitivity，則 specificity 也相對的提高
9. ruminants 的 B cells 在 ileal Peyer's patches 發育成熟
10. MHC I peptide 的 anchor residues 位在 peptide 的中央
11. proteasome 是在 RER 把 protein 切成 peptides
12. MHC 的重要性在種族對疾病之抵抗力

13. CLA-DR 為貓的 MHC II
14. virus 感染的 H-2^k mouse 之 Tc cells 可破壞 H-2^b 之 virus-infected target cells
15. exogenous Ag 也可能被 MHC I 所呈獻，此即 cross presentation
16. superantigen 只要認識 TCR V α 及 MHC II 即可活化 T cells
17. TCR 的 diversity 可藉由 imprecised joining of gene segments 及 somatic mutation 產生
18. TNF- α 可抑制 lipoprotein lipase 的合成及抑制食慾，導致 cachexia
19. IFN- γ 及 TNF- α 參與 bacterial superantigens 造成的 toxic-shock syndrome
20. Aa + 之母馬若第二次懷 Aa- 之幼馬將有可能造成幼馬之 hemolytic disease of new born
21. type IV hypersensitivity 參與的細胞主要是 M ϕ 及 Th1 cells
22. Ab 誘發 trypanosome 之 VSG 表現
23. DNA vaccine 主要靠 muscle cells 做 Ag presentation
24. inactivated influenza vaccine 可用來治療 influenza 感染
25. DC 可吞噬 tumor cell 或其 Ag，然後經由 MHC I + peptide 活化 Tc

※選擇題第 26~47 題請作答於「選擇題作答區」。

- B. 選擇題及相關題 (選出和前面名稱有相關的答案) (單選)
26. TLR: 1) bacterial CpG dinucleotide 2) found only in insect 3) 1&2
27. DC: 1) recognizes PRRs 2) constitutively expresses B7 3) cannot activate naïve T cells 4) 1&2&3
28. Innate immunity: 1) poor self/nonself discrimination 2) limited diversity 3) memory response 4) 1&2&3
29. slg: 1) IgG 2) Ig monomer 3) SC 4) 1&2&3
30. ADCC: 1) Ab 2) FcR 3) NK 4) 1&2&3
31. Anergy: 1) unresponsiveness to antigenic stimulus 2) B cell encounters Ag in the absence of T-cell help 3) 1&2
32. T-cell help: 1) CD40L vs CD40 2) Th cytokines 3) memory formation 4) 1&2&3
33. 關於 B7 下列何者有誤 1) 好的 APC 要具備此分子 2) 有核細胞都有此分子 3) membrane protein 4) 可和 CD28 結合
34. T-cell epitope 1) bound to MHC 2) hydrophilic 3) a polysaccharide 4) conformational epitope
35. 下列那個是 T-independent 1) memory response 2) affinity maturation 3) IgM response to polysaccharide 4) class switching
36. ELISPOT: 1) cytokine-producing cells 2) soluble colored product 3) radioisotope 4) 1&2&3
37. avidity 是 affinity 的 1) 平方 2) 2 倍 3) 3 倍 4) 4 倍

38. Germinal center: 1) class switching 2) somatic hypermutation 3) affinity maturation 4) 1&2&3
39. Negative selection causes the death of cells with high-affinity receptors for 1) self MHC + self Ag 2) self MHC + foreign Ag 3) foreign MHC + self Ag 4) foreign MHC + foreign Ag
40. M cell: 1) MALT 2) a specialized epithelium 3) forms a pocket 4) 1&2&3
41. MHC gene: 1) less polymorphic 2) allelic exclusion 3) codominant expression 4) 1&2&3
42. MHC I $\alpha 1/\alpha 2$: 1) open at both end 2) polymorphic 3) 1&2
43. cytokines: 1) low molecular weight 2) high quantity 3) long half-life 4) 1&2&3
44. cytokine receptor: 1) multi-subunits 2) high affinity 3) membrane protein 4) 1&2&3
45. activation of CTL-P: 1) licensed APC 2) CD28-B7 interaction 3) IL-2 4) 1&2&3
46. NK: 1) opposing-signals model 2) MHC restriction 3) immunologic memory 4) 1&2&3
47. viral infection 1) 只刺激 Th1 response 2) 只刺激 Th2 response 3) CMI 較重要 4) humoral immunity 較重要

C. 配合題 (單選)

48. IL-8 a) important for lymphoid organogenesis
49. IL-12 b) promotes growth and differentiation of eosinophils
50. TNF- β c) a neutrophil chemotactic factor
d) promotes terminal differentiation into plasma cells
e) induces Th 1 differentiation
f) induces Th2 differentiation
g) an inhibitory cytokine