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UNIVERSITI SAINS MALAYSIA

First Semester Examination  
Academic Session 2004/2005

October 2004

**ZCT 531/4 - Human Anatomy and Physiology**  
*[Anatomi dan Fisiologi Manusia]*

Duration : 3 hours  
*[Masa : 3 jam]*

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Please check that this examination paper consists of **NINE** pages of printed material before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **SEMBILAN** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

**Instructions:** Answer **FIVE** (5) questions only. Students are allowed to answer all questions in Bahasa Malaysia or in English.

**[Arahan:** Jawab **LIMA** (5) soalan sahaja. Pelajar dibenarkan menjawab semua soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

1. (a) Name the 4 most common elements found in the human body. Besides these, list at least 6 other essential elements present.  
 [(a) *Namakan 4 elemen yang terbiasa ditemui dalam badan manusia. Selain daripada elemen-elemen itu, senaraikan sekurang-kurangnya 6 lagi elemen yang perlu ada.*]

(5/100)

- (b) Write short notes on the following:  
 [(b) *Tulis nota-nota ringkas bagi yang berikut:*]

proteins  
 [*protein*]  
 lipids  
 [*lipid*]  
 carbohydrates  
 [*karbohidrat*]  
 nucleic acids  
 [*asid nukleik*]  
 viscosity of blood  
 [*kelikatan darah*]

(25/100)

- (c) Explain the meaning of the following:  
 [(c) *Terangkan maksud bagi yang berikut:*]

anabolism  
 [*anabolisme*]  
 catabolism  
 [*katabolisme*]  
 cell organelles  
 [*organel sel*]  
 cytosol  
 [*sitosol*]  
 frontal plane  
 [*satah frontal*]  
 parasagittal plane  
 [*satah parasagital*]  
 osteoblasts  
 [*osteoblas*]  
 osteoclasts  
 [*osteoklas*]  
 integumentary system  
 [*sistem integumen*]  
 ceruminous glands  
 [*kelenjar serumen*]

(30/100)

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(d) Describe the various mechanisms involved in the movement of materials across plasma membranes.

[(d) *Perihalkan mekanisme-mekanisme yang terlibat dalam gerakan bahan melintasi membran plasma.*]

(35/100)

(e) List the functions of the respiratory system.

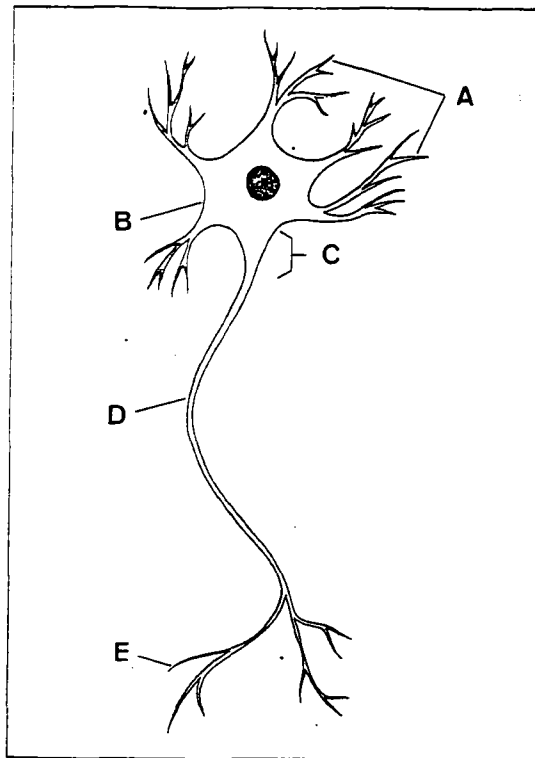
[(e) *Senaraikan fungsi-fungsi sistem pernafasan.*]

(5/100)

2. (a) Label the following schematic diagram of a neuron.

[(a) *Labelkan gambarajah berskema berikut bagi suatu neuron.*]

(5/100)



(b) Explain the meaning of graded potentials and action potentials and how they are produced.

[(b) *Jelaskan maksud potensial bergred serta potensial aksi dan bagaimana potensial-potensial itu dihasilkan.*]

(35/100)

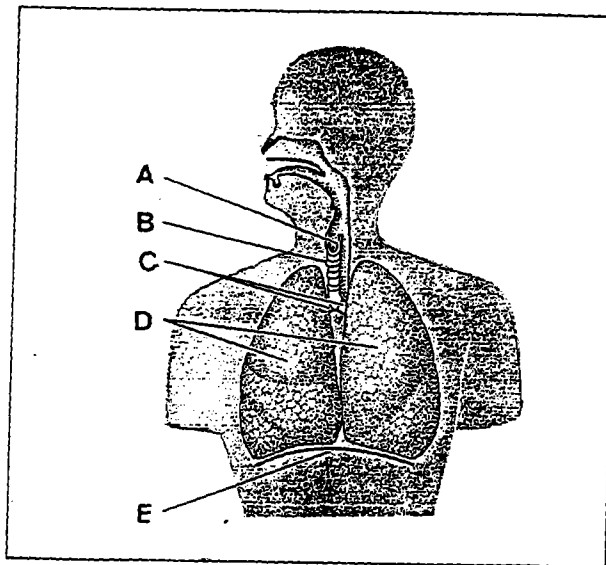
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- (c) With the help of diagrams, briefly describe the structure of skeletal muscle cells.  
 [(c) *Dengan bantuan gambarajah, secara ringkas perihalkan struktur sel otot rangka.*]  
 (25/100)
- (d) Explain the role and movement of calcium ions during skeletal muscle contraction.  
 [(d) *Terangkan peranan dan pergerakan ion-ion kalsium semasa otot skeletal berkonstraksi.*]  
 (35/100)
3. (a) List the functions of the circulatory system.  
 [(a) *Senaraikan fungsi-fungsi sistem peredaran.*]  
 (5/100)
- (b) Briefly explain the factors that control cardiac output.  
 [(b) *Secara ringkas, terangkan faktor-faktor yang mengawal output kardiak.*]  
 (30/100)
- (c) Write short notes on the following:  
 [(c) *Tulis nota-nota ringkas bagi yang berikut:*
- specialised cells found in blood  
 [*sel-sel dalam darah*]  
 conducting system of the heart  
 [*sistem konduksi jantung*]  
 functions of the skeleton  
 [*fungsi-fungsi skeleton*]  
 synovial joints.  
 [*sendi sinovial*]
- (20/100)
- (d) Explain the significance of the oxygen - hemoglobin saturation curve and factors affecting it.  
 [(d) *Jelaskan kesignifikanan lengkung tepuan oksigen - hemoglobin serta faktor-faktor yang mempengaruhinya.*]  
 (25/100)
- (e) Explain the meaning of the following:  
 [(e) *Jelaskan maksud yang berikut:]*
- anatomic dead space  
 [*ruang mati anatomi*]

vital capacity  
 [muatan vital]  
 pulse pressure  
 [tekanan nadi]  
 ejection fraction  
 [pecahan pancutan]  
 respiratory quotient  
 [hasil bagi respiratori]

(15/100)

- (f) Identify the components in the following diagram.  
 [(f) Kenalpasti komponen-komponen yang tertunjuk dalam gambarajah berikut.]



(5/100)

4. (a) Write short notes on the following:  
 [(a) Tulis nota ringkas tentang:]

- (i) liver  
 [(i) hati]  
 (ii) thyroid gland  
 [(ii) kelenjar tiroid]  
 (iii) posterior pituitary gland  
 [(iii) kelenjar pituitari posterior]

(30/100)

- (b) The kidneys play important roles in homeostasis. Discuss.  
 [(b) *Ginjal memainkan peranan penting dalam homeostasis. Bincangkan.*]  
 (60/100)

- (c) Match each item in column A with the most closely related item in column B. Give your answer in the format 1..a; 2..b etc.

N.B.: Not all the items in column B will be used.

- [(c) *Padankan setiap perkara dalam senarai A dengan perkara yang paling sesuai daripada senarai B. Berikan jawapan anda dalam format 1..a; 2..b dsbnya.*

*Nota: tidak semua perkara dalam senarai B akan digunakan.]*

COLUMN A [SENARAI A]

1. gametes  
[gamet]
2. gonads  
[gonad]
3. interstitial cells  
[sel interstisial]
4. seminal vesicles  
[vesikel seminal]
5. bulbourethral glands  
[kelenjar bulbouretral]
6. corpus luteum  
[korpus luteum]
7. endometrium  
[endometrium]
8. menarche  
[menarke]
9. clitoris  
[kelentit]
10. prepuce  
[prepus]

COLUMN B [SENARAI B]

- a. production of androgens  
[menghasilkan androgen]
- b. outer muscular uterine wall  
[lapisan otot luaran uterin]
- c. high concentration of fructose  
[tahap kepekatan fruktosa tinggi]
- d. female erectile tissue  
[tisu erektil wanita]
- e. secretes thick, sticky, alkaline mucus  
[mengeluarkan lendir alkali yang pekat dan melekit]
- f. uterine lining  
[lapisan dalaman uterus]
- g. reproductive cells  
[sel reproduktif/biakan]
- h. female puberty  
[puberti/baligh wanita]
- i. male puberty  
[puberti/baligh lelaki]
- j. secretes antibiotik  
[mengeluarkan sejenis antibiotik]
- k. reproductive organs  
[organ biakan]
- l. foreskin of penis  
[kulit khatan]
- m. endocrine structure  
[struktur endokrin]
- n. sexual intercourse  
[persetubuhan/hubungan seks]
- o. milk production  
[pengeluaran susu]

(10/100)

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5. (a) With the help of a suitable diagram(s), identify the locations of endocrine glands in the human body.  
Name the hormones produced.  
[[a) Dengan berpandukan gambarajah yang sesuai, kenalpastikan kedudukan kelenjar-kelenjar endokrin dalam manusia.  
Senaraikan hormon-hormon yang dikeluarkan.]
- (30/100)
- (b) Describe how the human body maintains the concentration of glucose.  
[[b) Terangkan bagaimana tubuh badan manusia mengekalkan kepekatan glukosa dalam badan.]
- (40/100)
- (c) Write short notes on the following  
[[c) Tulis nota ringkas tentang:]
- (i) puberty  
[[i) baligh]
- (ii) menopause  
[[ii) menopos]
- (20/100)
- (d) Match each item in column A with the most closely related item in column B. Give your answer in the format 1..a; 2..b etc.  
N.B.: not all items in column B will be used.  
[[d) Padankan setiap perkara dalam senarai A dengan perkara yang paling sesuai daripada senarai B. Berikan jawpan anda dalam format 1..a; 2..b, dsbnya.  
Nota: tidak semua perkara dalam senarai B akan digunakan.]

COLUMN A [SENARAI A]

1. ADH (Anti-Diuretic Hormone)  
[ADH (Anti-Diuretik Hormon)]
2. Aldosterone  
[Aldosteron]
3. Renal Corpuscle  
[Renal Korpuscle]
4. Afferent arteriole  
[Arteriol aferen]
5. Efferent arteriole  
[Arteriol eferen]
6. External urethral sphincter  
[Sfinkter uretra luar]
7. Internal urethral sphincter  
[Sfinkter uretra dalam]

COLUMN B [SENARAI B]

- a. site of urine production  
[tempat penghasilan urin]
- b. causes sensation of thirst  
[menyebabkan sensasi haus]
- c. voluntary control  
[pengawalan voluntari]
- d. capillaries around renal loop (Loop of Henle)  
[kapilari mengelilingi loop renal]
- e. renal pyramids  
[piramid renal]
- f. micturation  
[micturation]
- g. exit for blood vessels  
[tempat saluran darah keluar]

COLUMN A [SENARAI A]

8. Urination  
[Urination]
9. Nephrons  
[Nefron]
10. Vasa recta  
[Vasa recta]

COLUMN B [SENARAI B]

- h. fibrous covering  
[lapisan fibrous]
- i. blood leaves glomerulus  
[darah meninggalkan glomerulus]
- j. involuntary control  
[kawalan tak voluntari]
- k. blood enters glomerulus  
[darah masuk glomerulus]
- l. causes accelerated sodium reabsorption  
[menyebabkan peningkatan penyerapan semula natrium]
- m. contains glomerulus  
[mengandungi glomerulus]
- n. causes accelerated sodium loss  
[menyebabkan peningkatan kehilangan natrium]
- o. muscular layer  
[lapisan otot]

(10/100)

6. (a) Identify the functions of the reproductive system. (20/100)  
[(a) *Kenalpasti fungsi-fungsi sistem reproduktif manusia.*]
- (b) Describe the differences between the nervous system and the endocrine system. (20/100)  
[(b) *Terangkan perbezaan antara sistem saraf dan sistem endokrin.*]
- (c) Write short notes on the following (20/100)  
[(c) *Tulis nota ringkas mengenai*
- (i) parathyroid gland  
[(i) *kelenjar paratiroid*]
- (ii) adrenal gland  
[(ii) *kelenjar adrenal*]
- (d) With the help of suitable diagrams identify the microscopic anatomy and the functions of the following parts of the digestive tract. (30/100)  
[(d) *Dengan berpandukan gambarajah yang sesuai, kenalpasti anatomi mikroskopik dan fungsi bahagian sistem digestif yang berikut:*
- (i) stomach  
[(i) *gastrik (perut)*]
- (ii) small intestine  
[(ii) *usus kecil*]

(30/100)

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- (e) Match each item in column A with the most closely related item in column B. Give your answer in the format 1..a, 2..b etc.

N.B.: not all items in column B will be used.

- [(e) Padankan setiap perkara dalam senarai A dengan perkara yang paling sesuai daripada senarai B. Berikan jawapan anda dalam format 1..a, 2..b dsbnya.

Nota: tidak semua perkara dalam senarai B akan digunakan.]

COLUMN A [SENARAI A]

1. glucose formation  
[pembentukan glukos]
2. A; D; E; K  
[A; D; E; K]
3. lipid catabolism  
[katabolisme lipid]
4. B complex; C  
[kompleks B; C]
5. uric acid  
[asid urik]
6. peristalsis  
[peristalsis]
7. bile salts  
[garam 'bile']
8. liver cells  
[sel hati]
9. parietal cells  
[sel 'parietal']
10. chief cells  
[sel 'chief']

COLUMN B [SENARAI B]

- a. gluconeogenesis  
[glukoneogenesis]
- b. glycolysis  
[glikolisis]
- c. essential fatty acids  
[asid lemak penting]
- d. fat soluble vitamins  
[vitamin larut lemak]
- e. inner lining of digestive tract  
[lapisan dalaman saluran digestif]
- f. decrease in pH  
[penurunan pH]
- g. lipolysis  
[lipolisis]
- h. nitrogenous waste  
['nitrogenous waste']
- i. moves materials along digestive tract  
[menggerakkan bahan dalam saluran digestif]
- j. produces pepsinogen  
[menghasilkan pepsinogen]
- k. produces hydrochloric acid  
[menghasilkan asid hidroklorik]
- l. emulsifies fats  
[mengemulsikan lemak]
- m. water soluble vitamins  
[vitamin larut air]
- n. hepatocytes  
[hepatosit]
- o. pyloric sphincter  
[sfinkter pilorik]

(10/100)