

111 學年度學士後醫學系招生考試 生化概論 試題

Choose one best answer for the following questions

【單選題】 每題 1 分，共計 30 分，答錯 1 題倒扣 0.25 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。1~15 題為普通生物，16~30 題為生化概論。

16. What following pairs have the lowest dissociation constant?
 (A) Enzyme and substrate (B) Typical receptor and ligand interaction
 (C) Antibody and antigen (D) Sequence-specific protein and DNA
 (E) Biotin and avidin
17. What difference(s) is there between cellulose and chitin?
 (A) N-acetyl moiety (B) $\alpha 1 \rightarrow 4$ and $\beta 1 \rightarrow 4$ linkages
 (C) $\alpha 1 \rightarrow 4$ and $\alpha 1 \rightarrow 3$ linkages (D) Galactose and glucose moiety
 (E) $\alpha 1 \rightarrow 4$ and $\alpha 1 \rightarrow 6$ linkages
18. What is the precursor of long-chain fatty acids?
 (A) Linoleate (B) α -Linolenate (C) Oleate
 (D) Stearate (E) Palmitate
19. Which amino acid side chain has the highest pKa?
 (A) Arginine (B) Cysteine (C) Histidine (D) Lysine (E) Tyrosine
20. What statement for cell cycle is **FALSE**?
 (A) G₀: reentry point
 (B) G₁ phase: RNA and protein synthesis. No DNA synthesis.
 (C) S phase: DNA synthesized doubles
 (D) G₂ phase: DNA and protein synthesis continue
 (E) M phase: mitosis
21. In the pairs of precursor/product, which is **FALSE**?
 (A) acetyl-CoA/fatty acid
 (B) isopentenyl diphosphate/cholesterol
 (C) glutamine/purines
 (D) arginine/pyrimidine
 (E) dihydroxyacetone phosphate/triacylglycerol
22. Which of the following coenzymes is required for methionine synthase?
 (A) methylcobalamin (B) pyridoxal phosphate (C) tetrahydrofolic acid
 (D) S-adenosylmethionine (E) NADH

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23. Which of the following is located in mitochondria intermembrane space?
(A) complex II (B) coenzyme Q (C) complex III
(D) cytochrome C (E) complex IV
24. Which of the following polysaccharides contains sulfate groups?
(A) heparin (B) hyaluronic acid (C) peptidoglycan
(D) chitin (E) None of the above
25. In humans, uric acid is an end product in the metabolism of _____.
(A) Amino acids (B) Phospholipids (C) Purines
(D) Pyrimidines (E) Cholesterol
26. Which of the following statements about miRNAs and siRNAs is **FALSE**?
(A) miRNAs can block the translation of mRNA.
(B) miRNAs is a non-coding RNA.
(C) miRNAs and siRNAs promote mRNA degradation.
(D) RNA polymerase II regulates the expression of miRNA gene.
(E) Drosha is involved in the processing of miRNAs and siRNAs
27. In aerobic state, the reaction of glycolysis (one molecule of glucose) produces _____.
(A) two molecules of pyruvate, four molecules of ATP, and two molecules NADH miRNAs can block the translation of mRNA
(B) two molecules of pyruvate, two molecules of ATP, and four molecules NADH
(C) two molecules of pyruvate, two molecules of ATP, and three molecules NAD⁺
(D) two molecules of pyruvate, two molecules of ATP, and two molecules NADH
(E) two molecules of pyruvate, two molecules of ATP, and two molecules NAD⁺
28. Spike (S) is a glycoprotein found on the surface of coronaviruses. S protein has 1273 residues in SARS-CoV-2 and has a molecular weight of 180–200 kDa. Based on the above information, we know that _____.
(A) the SARS-CoV-2 has a genome of 29,881 bp in length
(B) the expressed S protein from *E. coli* would have a molecular weight around 140 kDa
(C) S protein is a dimer
(D) S protein binds to the host cell by recognizing the receptor ACE2
(E) S protein plays a key role in cell membrane fusion process

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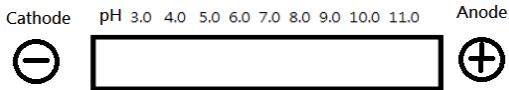
29. Which of the following pairs about the accumulated molecules and metabolic disorder is **NOT** correct?
- (A) Homogentisate - Alkaptonuria
 (B) Tyrosine - Phenylketouria
 (C) Homocysteine - Homocystinuria
 (D) Branched-chain α -keto acids - Maple syrup urine disease
 (E) Uric acid - Gout
30. The following statements about DNA replication in *E. coli* are correct **except**:
- (A) Both leading strand and lagging strand require primer.
 (B) DNA polymerase adds a new nucleotide to the free 3'OH of the existing nucleic acid.
 (C) The principal replication enzyme is DNA polymerase I.
 (D) It also has a 3'→5' exonuclease activity.
 (E) It is a processive enzyme.
- 【單選題】** 每題 2 分，共計 120 分，答錯 1 題倒扣 0.5 分，倒扣至本大題零分為止，未作答，不給分亦不扣分。31~60 題為普通生物，61~90 題為生化概論。
61. What amino acid is often phosphorylated by active insulin receptor?
- (A) Serine (B) Threonine (C) Tyrosine (D) Histidine (E) Arginine
62. What compound offers the one-carbon unit to produce N⁵, N¹⁰-methylene tetrahydrofolate in one carbon metabolism?
- (A) Methionine (B) Serine (C) S-Adenosyl methionine
 (D) Choline (E) Glycine
63. What enzyme(s) is required for the cleavage of the unmethylated strand during the mismatched repair?
- (A) MutL (B) MutH
 (C) MutS (D) DNA helicase II/exonuclease VII
 (E) Exonuclease I/exonuclease X
64. What domain(s) of regulatory proteins for gene regulation is involved in dimerization?
- (A) Helix-turn-helix (B) Helix-loop-helix (C) Zinc finger
 (D) Homeodomain (E) All of the above

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65. Which statement for hemoglobin (the oxygen-binding protein in red blood cells) is **FALSE**?
- (A) Hemoglobin exists in T and R states and R state prefers to bind oxygen.
 - (B) Oxygen binding converts hemoglobin from T to R state.
 - (C) Oxygen binding to hemoglobin is both allosteric and cooperative.
 - (D) Hemoglobin also binds H^+ and CO_2 to lessen the affinity for O_2 .
 - (E) Oxygen binding is also regulated by 2,3-bisphosphoglycerate, which stabilizes R state.
66. For treatment of AIDS, which is **NOT** a target for the approved drugs?
- (A) CD4
 - (B) reverse transcriptase
 - (C) neuraminidase
 - (D) protease
 - (E) integrase
67. Which of the following receptors and their types does **NOT** match?
- (A) Insulin receptor is a G-protein-coupled receptor.
 - (B) Epidermal growth factor receptor is a receptor tyrosine kinase.
 - (C) Acetylcholine receptor is a gated ion channel.
 - (D) Integrin receptor is an adhesion receptor.
 - (E) Steroid receptor is a nuclear receptor.
68. Which of the following compounds has the highest (the most negative) standard free energy of hydrolysis?
- (A) ATP (to ADP)
 - (B) ADP (to AMP)
 - (C) AMP (to adenosine)
 - (D) Glucose 6-phosphate (to glucose)
 - (E) Acetyl-CoA (to acetate)
69. Which of the following enzymatic cofactors and enzymes is **NOT** matched?
- (A) Biotin for pyruvate carboxylase
 - (B) NAD^+ for glucose 6-phosphate dehydrogenase
 - (C) Pyridoxal phosphate (PLP) for aminotransferases
 - (D) Thiamine pyrophosphate (TPP) for pyruvate decarboxylase
 - (E) Vitamin B12 for methylmalonyl-CoA mutase
70. How many ATP can be net produced in a 14-carbon fatty acid degradation to CO_2 and H_2O ?
- (A) 88
 - (B) 92
 - (C) 94
 - (D) 96
 - (E) 98
71. Fatty acids are carboxylic acids with hydrocarbon chains ranging from _____ carbons long.
- (A) 12 to 24
 - (B) 4 to 36
 - (C) 6 to 24
 - (D) 6 to 36
 - (E) 12 to 32

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72. The molecular weight of Protein A ($pI = 4.0$), B ($pI = 6.8$), and C ($pI = 8.5$) is 14 kDa, 24 kDa, and 30 kDa, respectively. All of them are monomer proteins. Which of the following statements is **CORRECT**?
- (A) Protein A elutes out first, when you use gel filtration column to separate the mixture of those three proteins.
- (B) Protein C is the one that moves fastest, when you separate the mixture of those three proteins by SDS-PAGE.
- (C) As shown in the right figure, you can use this isoelectric focusing apparatus to separate those three proteins.
- (D) When you use a DEAE ion exchange column and 10 mM Tris-Cl, pH 7.0 buffer to separate these three proteins, Protein A will be bound by this column.
- (E) None of the above
- 
73. Which of the following is **NOT** related to RNA-RNA interaction?
- (A) guide RNA (B) Wobble
(C) Shine-Dalgarno sequence (D) snRNA
(E) None of the above
74. (1) Arg; (2) Asp; (3) Gly; (4) Cys; (5) His; (6) Ser; (7) Thr. Which of the followings does **NOT** appear in the preceding seven amino acid residues?
- (A) The amino acid residue in zinc finger to coordinate zinc atom
(B) The amino acid residue in O-link glycoprotein to link protein and oligosaccharide
(C) The amino acid residue in Type I topoisomerase to act as a nucleophile to cut DNA
(D) The amino acid residue in terminal proteins of adenovirus to link nucleotides and protein
(E) None of the above
75. Which of the following compounds is the substrate of ribonucleotide reductase?
- (A) AMP (B) TDP (C) GTP (D) CDP (E) dAMP
76. (1) Ribozyme; (2) Okazaki fragment; (3) DNA polymerase needs an RNA primer but RNA polymerase doesn't; (4) *de novo* biosynthesis of purine and pyrimidine; (5) retrovirus; (6) thermostable DNA polymerase. How many of the preceding items support the hypothesis that RNA appears before DNA?
- (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

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77. (1) release of acetyl-CoA; (2) release of CO₂; (3) release of NADH. Pyruvate dehydrogenase can convert pyruvate into acetyl-CoA, NADH, and CO₂. What is its reaction order of preceding three steps?
- (A) (1) → (2) → (3) (B) (1) → (3) → (2) (C) (2) → (1) → (3)
(D) (2) → (3) → (1) (E) (3) → (1) → (2)
78. Xeroderma pigmentosum is caused by a defect in which DNA repair pathway.
- (A) Repair of oxidative damage (B) Daughter-strand gap repair
(C) Base excision repair (D) Mismatch repair
(E) Nucleotide excision repair
79. The reverse transcriptases possess the function of ① RNA-directed DNA polymerase activity ② Primase ③ DNA-directed DNA polymerase activity ④ RNase H activity ⑤ Helicase
- (A) ①②③ (B) ①②④ (C) ①②⑤ (D) ①③④ (E) ①③⑤
80. Which of the following statements about the catabolism of free pyrimidines in the human body is **CORRECT**? ① Free cytosine and uracil are not salvaged ② Degradation of free cytosine produces β-alanine, CO₂, and NH₄⁺ ③ Degradation of free uridine produces β-aminoisobutyric acid, CO₂, and NH₄⁺ ④ Free thymine are recycled for synthesizing nucleosides
- (A) ①②③ (B) ①②④ (C) ①② (D) ①③ (E) ①③④
81. Which of the following statements about allosteric regulation is **TRUE**?
- (A) An allosteric inhibitor of an enzyme can be a competitive inhibitor.
(B) An allosteric activator of an enzyme may reduce the apparent V_{max}.
(C) An allosteric activator cannot be substrate of allosteric enzymes.
(D) An allosteric activator reduces the apparent K_m.
(E) An allosteric effector is a transition state analogue.
82. Which of the following products are produced by the β-oxidation of fatty acid? ① FADH₂ ② NAD⁺ ③ NADH ④ NADPH ⑤ Acetyl-CoA
- (A) ①②⑤ (B) ①③⑤ (C) ①④⑤ (D) ②③⑤ (E) ②④⑤
83. Lesch-Nyhan Syndrome is due to a deficient in _____ activity.
- (A) Adenosine deaminase
(B) Adenine phosphoribosyltransferase
(C) Guanine deaminase
(D) Hypoxanthine-guanine phosphoribosyltransferase
(E) AMP deaminase

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84. Eukaryotic mRNAs may be modified after synthesis via the following reactions *except*:
- (A) Remove noncoding regions (introns) and joining the coding regions (exon) by spliceosome
 - (B) Self-splicing of mitochondrial or chloroplast mRNA
 - (C) Cleavage at the 3' end of the primary transcript
 - (D) Addition of a string A residues at the 3' end
 - (E) Addition of a methyl-cytosine residue at the 5' end
85. An enzyme is found that catalyzes the reaction $S \rightarrow P$. Researchers find that the K_m for the substrate S is $4 \mu\text{M}$, and the k_{cat} is 20 min^{-1} . In an experiment, $[S]=6 \text{ mM}$, and $V_o=480 \text{ nM min}^{-1}$. What was the enzyme concentration $[E_t]$ used in the experiment?
- (A) 24 nM (B) 24 μM (C) 120 nM (D) 120 μM (E) 80 nM
86. Which pair of enzymes is involved in glycolysis but **NOT** in gluconeogenesis?
- (A) Hexokinase and phosphohexose isomerase
 - (B) Phosphofructokinase and pyruvate kinase
 - (C) Phosphofructokinase and phosphoglycerate kinase
 - (D) Phosphoglycerate kinase and pyruvate kinase
 - (E) Phosphoglycerate mutase and enolase
87. Amino acids can be classified into different groups based on the R-group structure. Which class of amino acids contains only nonessential amino acids?
- (A) Hydrophobic
 - (B) Aromatic
 - (C) Polar, uncharged
 - (D) Positively charged
 - (E) Negatively charged
88. The functions of cholesterol include all the following *except*:
- (A) A precursor of bile
 - (B) A precursor of vitamin D
 - (C) As an intracellular energy source
 - (D) Sustain cell membrane structure
 - (E) Essential for producing steroid hormone

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89. The following statements about lipid transport are all correct *except*:

- (A) Dietary triacylglycerols and cholesterol from intestine is carried by chylomicrons to muscle and adipose tissues.
- (B) VLDL carries triacylglycerols and cholesterol from liver to muscle and adipose tissues.
- (C) LDL carries mainly triacylglycerol from liver to muscle and adipose tissues.
- (D) HDL synthesized from liver picks up cholesterol in the bloodstream and transported back to liver.
- (E) The loss of triacylglycerols converts VLDL to LDL.

90. Which of the following posttranslational modifications is applied to produce active insulin molecules in pancreatic β cells:

- ① Phosphorylation of Ser residues
- ② Glycosylation of Asn residues
- ③ Cleavage of a signal sequence
- ④ Proteolytic cleavage of internal sequences
- ⑤ Formation of disulfide bonds

- (A) ③④⑤ (B) ②③④ (C) ②⑤ (D) ①②④⑤ (E) ①②③⑤

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後醫-普通生物及生化概論

題號	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
答案	C	B	A	B	E	C	A	B	D	B	D	C	E	B	C	E	A	E	A	D
題號	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
答案	D	A	D	A	C	E	D	B	B	C	C	B	E	D	C	A	C	B	D	D
題號	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
答案	E	C	D	A	E	C	C	E	B	B	B	C	D	E	A	E	E	C	A	E
題號	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
答案	C	B	B	B	E	C	A	B	B	B	B	D	E	C	D	C	C	E	D	C
題號	81	82	83	84	85	86	87	88	89	90										
答案	D	B	D	E	A	B	E	C	C	A										

高雄醫學大學 111 學年度學士後醫學系招生考試試題參考答案疑義釋疑公告

科目	題號	釋疑答覆	釋疑結果
生化概論	16	考生提出釋疑應該是生物學科，不是第16題的生化，第16題仍維持原答案無誤。	E
	18	只有Palmitate屬於16C，其餘選項為18C。長鏈脂肪酸從16C開始合成。維持原答案無誤。	E
	22	Methylcobalamin 和tetrahydrofolic acid 均扮演Methionine synthase的coenzyme，因此選項AC均可。	AC 均可
	27	維持原答案無誤。	D
	28	題意並未提及 S protein 扮演細胞膜融合過程的角色。維持原答案無誤。	B
	29	因為 選項 ACDE 都是正確敘述，選項 B (Tyrosine-Phenylketouria)應該為 Phenylalanine-Phenylketonuria，雖然少打一個字母，但並不影響判讀。所以仍維持原答案。	B
	62	Glycine cleavage enzyme亦可將Glycine分解產生 methylene，進行N5, N10-methylene tetrahydrofolate合成。因此更改選項B, E均可。	BE 均可
	64	Steroid hormone receptor 利用其結構上的2個Zinc finger domain結合在DNA上，而此蛋白並非Dimer。維持原答案無誤。	B
	69	維持原答案無誤。	B
	71	脂肪酸的碳鏈長度(Ranging from 4C~36C)。維持原答案無誤。	B
	72	IEF, low pH應該接上“+”極，所以(C)不正確。維持原答案無誤。	D
	73	選項 ABCD 皆與 RNA-RNA interaction 有關。維持原答案。	E
	76	DNA lagging strand 在合成 Okazaki fragment 需要 RNA primer。因此維持原答案。	C
	80	無正確答案。	送分
89	HDL is synthesized mainly by the liver, and also by the intestines. 因此維持原答案。	C	

生化概論

莊老師(施政安)老師提供

精選試題解析

- (E) 16. What following pairs have the lowest dissociation constant?
 (A) Enzyme and substrate (B) Typical receptor and ligand interaction
 (C) Antibody and antigen (D) Sequence-specific protein and DNA
 (E) Biotin and avidin

試解：

<u>Binding</u>	<u>Kd (dissociation constant/ M)</u>
Biotin-avidin	10^{-15}
Ab-Ag	$10^{-12} \sim 10^{-8}$
DNA-protein	$5 \times 10^{-11} \sim 10^{-7}$
Receptor-ligand	$10^{-11} \sim 10^{-5}$
<u>Enzyme-substrate</u>	<u>$10^{-7} \sim 10^{-3}$</u>

(Lehninger: principles of biochemistry, 2021 8 edition, p.151, Table 5-1)

=>故選 (E)

- (E) 18. What is the precursor of long-chain fatty acids?
 (A) Linoleate (B) α -Linolenate (C) Oleate
 (D) Stearate (E) Palmitate

試解：



=>故選 (E)

- (D) 20. What statement for cell cycle is **FALSE**?
 (A) G₀: reentry point
 (B) G₁ phase: RNA and protein synthesis. No DNA synthesis.
 (C) S phase: DNA synthesized doubles
 (D) G₂ phase: DNA and protein synthesis continue
 (E) M phase: mitosis

試解：

G₂ phase: cell growth and protein synthesis

=>故選 (D)

- (D) 21. In the pairs of precursor/product, which is **FALSE**?
 (A) acetyl-CoA/fatty acid
 (B) isopentenyl diphosphate/cholesterol
 (C) glutamine/purines
 (D) arginine/pyrimidine
 (E) dihydroxyacetone phosphate/triacylglycerol

試解：

(D) arginine/pyrimidine → 應是 glutamine/pyrimidine 才對
=>故選 (D)

- (D) 23. Which of the following is located in mitochondria intermembrane space?
 (A) complex II (B) coenzyme Q (C) complex III
 (D) cytochrome C (E) complex IV

試解：

cytochrome c 是 peripheral protein 即附著在 inner-membrane 外側, 故等同位於 intermembrane space
=>故選 (D)

- (A) 24. Which of the following polysaccharides contains sulfate groups?
 (A) heparin (B) hyaluronic acid (C) peptidoglycan
 (D) chitin (E) None of the above

試解：

glycosaminoglycan 有 6 種, 只有 hyaluronic acid 不含 S
=>故選 (A) heparin 有含 S

- (E) 26. Which of the following statements about miRNAs and siRNAs is **FALSE**?
 (A) miRNAs can block the translation of mRNA.
 (B) miRNAs is a non-coding RNA.
 (C) miRNAs and siRNAs promote mRNA degradation.
 (D) RNA polymerase II regulates the expression of miRNA gene.
 (E) Drosha is involved in the processing of miRNAs and siRNAs

試解：

Drosha 只作用於 pri-miRNA =>故選 (E)

- (B) 28. Spike (S) is a glycoprotein found on the surface of coronaviruses. S protein has 1273 residues in SARS-CoV-2 and has a molecular weight of 180–200 kDa. Based on the above information, we know that _____.
 (A) the SARS-CoV-2 has a genome of 29,881 bp in length
 (B) the expressed S protein from *E. coli* would have a molecular weight around 140 kDa
 (C) S protein is a dimer
 (D) S protein binds to the host cell by recognizing the receptor ACE2
 (E) S protein plays a key role in cell membrane fusion process

試解：

只有描述 S protein 的 amino acid 數目及 Mr, 故只能推斷出沒有 Carbohydrate 的蛋白部份 $1273 \times 110 \text{ Dalton (Da)} \approx 140000 \text{ Dalton (140 kDa)}$
=>故選 (B)

- (C) 30. The following statements about DNA replication in *E. coli* are correct **except**:
 (A) Both leading strand and lagging strand require primer.

- (B) DNA polymerase adds a new nucleotide to the free 3'OH of the existing nucleic acid.
 (C) The principal replication enzyme is DNA polymerase I.
 (D) It also has a 3'→5' exonuclease activity.
 (E) It is a processive enzyme.

試解：

Replicase is DNA polymerase III

=>故選 (C)

- (C) 61. What amino acid is often phosphorylated by active insulin receptor?
 (A) Serine (B) Threonine (C) Tyrosine (D) Histidine (E) Arginine

試解：

Insuline receptor is a receptor tyrosine kinase (RTK)

=>故選 (C)

- (B) 62. What compound offers the one-carbon unit to produce N⁵, N¹⁰-methylene tetrahydrofolate in one carbon metabolism?
 (A) Methionine (B) Serine (C) S-Adenosyl methionine
 (D) Choline (E) Glycine

試解：

Serine is the major source of C1-unit

=>故選 (B)

- (B) 63. What enzyme(s) is required for the cleavage of the unmethylated strand during the mismatched repair?
 (A) MutL (B) MutH (C) MutS
 (D) DNA helicase II/exonuclease VII (E) Exonuclease I/exonuclease X

試解：

MutH function: 認識 hemi-methylated site 並在它旁邊切下一刀

=>故選 (B)

- (B) 64. What domain(s) of regulatory proteins for gene regulation is involved in dimerization?
 (A) Helix-turn-helix (B) Helix-loop-helix (C) Zinc finger
 (D) Homeodomain (E) All of the above

試解：

a. Dimer forms in DNA-binding motifs are HLH (helix-loop-helix) and leucine zipper.

b. Homeodomain is a form of HTH (helix-turn-helix) motif.

=>故選 (B)

- (C) 66. For treatment of AIDS, which is **NOT** a target for the approved drugs?
 (A) CD4 (B) reverse transcriptase (C) neuraminidase
 (D) protease (E) integrase

試解：

AIDS 是 retrovirus 不是 influenza A virus, 故不能用治療 influenza A virus 的藥物-克流感 (Tamiflu), Tamiflu 是 inhibitor of the neuraminidase
=>故選 (C)

- (A) 67. Which of the following receptors and their types does **NOT** match?
 (A) Insulin receptor is a G-protein-coupled receptor.
 (B) Epidermal growth factor receptor is a receptor tyrosine kinase.
 (C) Acetylcholine receptor is a gated ion channel.
 (D) Integrin receptor is an adhesion receptor.
 (E) Steroid receptor is a nuclear receptor.

試解：

Insulin receptor is RTK (receptor tyrosine kinase)
=>故選 (A)

- (B) 69. Which of the following enzymatic cofactors and enzymes is **NOT** matched?
 (A) Biotin for pyruvate carboxylase
 (B) NAD^+ for glucose 6-phosphate dehydrogenase
 (C) Pyridoxal phosphate (PLP) for aminotransferases
 (D) Thiamine pyrophosphate (TPP) for pyruvate decarboxylase
 (E) Vitamin B12 for methylmalonyl-CoA mutase

試解：

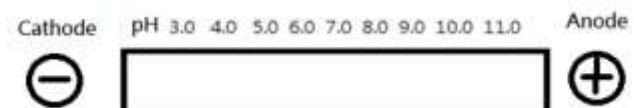
NAD^+ for glucose-6-phosphate dehydrogenase.
=>故選 (B)

- (B) 70. How many ATP can be net produced in a 14-carbon fatty acid degradation to CO_2 and H_2O ?
 (A) 88 (B) 92 (C) 94 (D) 96 (E) 98

試解：

Fatty acid (C_{2n}) : ATP 公式為 $4(n-1) + 10(n) - 2$
 $\Rightarrow \because n=7, \therefore 4(7-1) + 10(7) - 2 = 92 \text{ ATP}$
 =>故選 (B)

- (D) 72. The molecular weight of Protein A ($pI = 4.0$), B ($pI = 6.8$), and C ($pI = 8.5$) is 14 kDa, 24 kDa, and 30 kDa, respectively. All of them are monomer proteins. Which of the following statements is **CORRECT**?
 (A) Protein A elutes out first, when you use gel filtration column to separate the mixture of those three proteins.
 (B) Protein C is the one that moves fastest, when you separate the mixture of those three proteins by SDS-PAGE.
 (C) As shown in the right figure, you can use this isoelectric focusing apparatus to separate those three proteins.



- (D) When you use a DEAE ion exchange column and 10 mM Tris-Cl, pH 7.0 buffer to separate these three proteins, Protein A will be bound by this column.
(E) None of the above

試解：

- A. gel filtration : C (first)
B. SDS-PAGE: A (faster)
C. (-)極端必需是高 pH 值
D. DEAE 本身帶正電會吸住負電之 A protein ($pI = 4$, acidic protein with a negative charge at pH 7.0)

=>故選 (D)

高
點
醫
護

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