

Biotechnology Eligibility Test BET 2022

Topic:- BET SECTION S1 A

1) In the Table given below, the column (A) lists three eukaryotic RNA Polymerases and column (B) lists group of genes they transcribe. Identify the correct match from the options below:

A	B
i. RNA polymerase I	a. mRNA, miRNA, snRNA genes
ii. RNA polymerase II	b. tRNA and 5S rRNA genes
iii. RNA polymerase III	c. rRNA genes

[Question ID = 571][Question Description = 101_BETS1_SECTION_A_APR22_Q01]

1. i & c; ii & b; iii & a

[Option ID = 2281]

2. i & b; ii & c; iii & a

[Option ID = 2282]

3. i & b; ii & a; iii & c

[Option ID = 2283]

4. i & c; ii & a; iii & b

[Option ID = 2284]

2) 500 mg of a drug (Molecular weight 100) was intravenously injected into an individual having a blood volume of 5 liter. The drug is neither absorbed by the tissues nor it is excreted. If the drug is metabolized so that half of it is degraded in eight hours, what would be the molar concentration of the drug one day after injection?

[Question ID = 572][Question Description = 102_BETS1_SECTION_A_APR22_Q02]

1. 2.5 mM

[Option ID = 2285]

2. 1.25 mM

[Option ID = 2286]

3. 0.625 mM

[Option ID = 2287]

4. 0.0312 mM

[Option ID = 2288]

3) The motifs commonly found in the core promoter of eukaryotic protein coding genes are:[Question ID = 573][Question Description = 103_BETS1_SECTION_A_APR22_Q03]

1. TATA and Pribnow box [Option ID = 2289]

2. Motif ten element and TATA [Option ID = 2290]

3. BRE and Kozak consensus sequence [Option ID = 2291]

4. TRE and TATA [Option ID = 2292]

4) The cytosine residues in the DNA are methylated at specific di- or trinucleotide sequences. Which among these methylation motifs are found predominantly in case of protein-coding genes in plants? H stands for A, T or C.

[Question ID = 574][Question Description = 104_BETS1_SECTION_A_APR22_Q04]

1. CpG and CpHpG

[Option ID = 2293]

2. CpHpG and CpHpH

[Option ID = 2294]

3. CpGpG and CpHpH

[Option ID = 2295]

4. CpG and CpHpH

[Option ID = 2296]

5) While measuring the potassium concentration in a drug formulation, the technologist took 10 μl of the sample and mixed it with 90 μl of test buffer. From the resulting solution, he took 5 μl and measured its total potassium content as 25 ng. What would be the concentration of potassium in the drug formulation?[Question ID = 575][Question Description = 105_BETS1_SECTION_A_APR22_Q05]

1. 50 ng/ μl [Option ID = 2297]
2. 25 ng/ μl [Option ID = 2298]
3. 75 ng/ μl [Option ID = 2299]
4. 100 ng/ μl [Option ID = 2300]

6) You are given a 5 mM solution of sucrose. If you hydrolyse it by adding equal volume of 10 mM HCl, what would be the final concentration of glucose and fructose in the hydrolysate?[Question ID = 576][Question Description = 106_BETS1_SECTION_A_APR22_Q06]

1. 5 mM glucose and 5 mM fructose [Option ID = 2301]
2. 2.5 mM glucose and 2.5 mM fructose [Option ID = 2302]
3. 1.25 mM glucose and 1.25 mM fructose [Option ID = 2303]
4. 1.25 mM glucose and 2.5 mM fructose [Option ID = 2304]

7) You are measuring blood glucose level by glucose oxidase method. Following are the absorbance values that you got for the standard and the test sample. Determine the glucose concentration in the test sample:

Sample	Concentration	A ₅₀₅
Standard 1	0.4 mmol/L	0.120
Standard 2	0.6 mmol/L	0.180
Standard 3	0.8 mmol/L	0.240
Unknown	?	0.210

[Question ID = 577][Question Description = 107_BETS1_SECTION_A_APR22_Q07]

1. 0.65 mM
[Option ID = 2305]
2. 0.70 mM
[Option ID = 2306]
3. 0.725 mM
[Option ID = 2307]
4. 0.75 mM
[Option ID = 2308]

8) The introduction of the nonpolar molecule (toluene) into water results in:[Question ID = 578][Question Description = 108_BETS1_SECTION_A_APR22_Q08]

1. a decrease in the entropy of water. [Option ID = 2309]
2. an increase in the entropy of water. [Option ID = 2310]
3. no change in entropy of water. [Option ID = 2311]
4. modest exothermic dissolution. [Option ID = 2312]

9) Eukaryotic RNA Polymerase II transcribes:[Question ID = 579][Question Description = 109_BETS1_SECTION_A_APR22_Q09]

1. rRNA and tRNA genes [Option ID = 2313]
2. mRNA and tRNA genes [Option ID = 2314]
3. mRNA and 5S rRNA genes [Option ID = 2315]
4. mRNA, miRNA and snRNA genes [Option ID = 2316]

10) You are preparing a 500 ml solution containing 50 mM Tris (FW 120) buffer, 10 mM NaCl (FW 58.5), 5 mM EDTA (supplied solution is 500 mM). The quantity of each of the ingredients would be:[Question ID = 580][Question Description = 110_BETS1_SECTION_A_APR22_Q10]

1. 6.0 g Tris, 2.92 g NaCl, 5 ml EDTA [Option ID = 2317]
2. 3.0 g Tris, 0.292 g NaCl, 5 ml EDTA [Option ID = 2318]
3. 1.5 g Tris, 0.292 g NaCl, 5 ml EDTA [Option ID = 2319]
4. 0.75 g Tris, 0.029 g NaCl, 5 ml EDTA [Option ID = 2320]

11) In eukaryotes, nucleosomes comprise of which one of the following histones?

[Question ID = 581][Question Description = 111_BETS1_SECTION_A_APR22_Q11]

1. H1, H2A, H2B, and H3

[Option ID = 2321]

2. H2A, H2B, H3, and H4

[Option ID = 2322]

3. H1, H2B, H3, and H4

[Option ID = 2323]

4. H1, H2A, H3, and H4

[Option ID = 2324]

12) Match the items in List I with the items in List II

List I	List II
A. Sucrose	I. β -glycosidic link (D-glucose)
B. Lactose	II. α -glycosidic link (D-glucose)
C. Maltose	III. β -glycosidic link (D-glucose and D-galactose)
D. Cellobiose	IV. α -1, β -2-glycosidic link (D-glucose and D-fructose)

Choose the correct answer from the options given below:

[Question ID = 582][Question Description = 112_BETS1_SECTION_A_APR22_Q12]

1. A-II, B-IV, C-I, D-III

[Option ID = 2325]

2. A-I, B-III, C-IV, D-II

[Option ID = 2326]

3. A-III, B-II, C-I, D-IV

[Option ID = 2327]

4. A-IV, B-III, C-II, D-I

[Option ID = 2328]

13) Which one of the following statements is true with respect to optical activity?

[Question ID = 583][Question Description = 113_BETS1_SECTION_A_APR22_Q13]

1. A relationship exists between the (R) and (S) configurations of enantiomers and the direction [(+) or (-)] in which they rotate plane-polarized light.

[Option ID = 2329]

2. Equimolar mixture of D and L isomers of the same compound will be optically active.

[Option ID = 2330]

3. Meso compounds that are optically inactive may contain stereogenic centers or chiral centers.

[Option ID = 2331]

4. Optical activity is independent of temperature.

[Option ID = 2332]

14) Which one of the following compound(s) is/are NOT the carbon source of acetyl Co-A?

[Question ID = 584][Question Description = 114_BETS1_SECTION_A_APR22_Q14]

1. Ethanol

[Option ID = 2333]

2. Valine/ isoleucine

[Option ID = 2334]

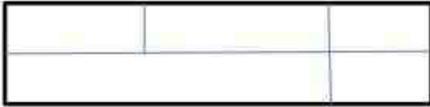
3. Pyruvate

[Option ID = 2335]

4. Oxaloacetate/ acetoacetate

[Option ID = 2336]

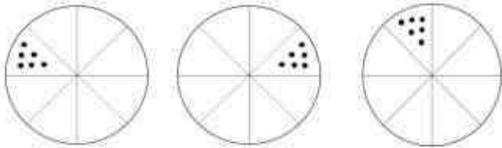
15) How many rectangles are there in the diagram?



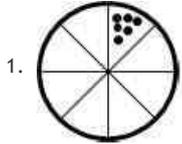
[Question ID = 585][Question Description = 115_BETS1_SECTION_A_APR22_Q15]

1. 8 [Option ID = 2337]
2. 9 [Option ID = 2338]
3. 10 [Option ID = 2339]
4. 12 [Option ID = 2340]

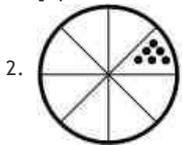
16) Find the next image in the series.



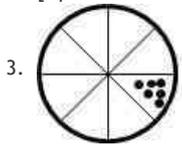
[Question ID = 586][Question Description = 116_BETS1_SECTION_A_APR22_Q16]



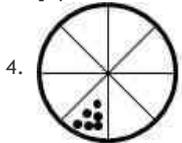
[Option ID = 2341]



[Option ID = 2342]



[Option ID = 2343]



[Option ID = 2344]

17) How many words can be formed with the letters of the word 'PATALIPUTRA'? [Question ID = 587][Question Description = 117_BETS1_SECTION_A_APR22_Q17]

1. $11!/2! 3!$ [Option ID = 2345]
2. $11!/2! 2! 3!$ [Option ID = 2346]
3. $11!/3! 1! 2!$ [Option ID = 2347]
4. $11!/3!$ [Option ID = 2348]

18) A ladder leaning against a wall is making an angle of 60° with the ground. If the length of the ladder is 18 m, find the distance of the foot of the ladder from the wall. [Question ID = 588][Question Description = 118_BETS1_SECTION_A_APR22_Q18]

1. $9/3$ m [Option ID = 2349]
2. 9 m [Option ID = 2350]
3. $18/\sqrt{2}$ m [Option ID = 2351]
4. $18/3$ m [Option ID = 2352]

19) The line $y = 2x$ from $x = 0$ to 1 is rotated around the y -axis. The volume generated is:

[Question ID = 589][Question Description = 119_BETS1_SECTION_A_APR22_Q19]

1. $1/2$

[Option ID = 2353]

2. $2/3$

[Option ID = 2354]

3. $3/4$

[Option ID = 2355]

4.

[Option ID = 2356]

20) The function $y = f(x) = x^2 - 6$ is plotted along with its inverse function $y = f^{-1}(x)$, where essentially the x & y axis are interchanged. These two curves will intersect at:

[Question ID = 590][Question Description = 120_BETS1_SECTION_A_APR22_Q20]

1. $(0, 0)$

[Option ID = 2357]

2. $(2, 3)$

[Option ID = 2358]

3. $(2, 2)$ & $(3, 3)$

[Option ID = 2359]

4. $(-2, -2)$ & $(3, 3)$

[Option ID = 2360]

21) The probability that 1st of January is a Sunday in at least one of the 3 randomly chosen years is given by:

[Question ID = 591][Question Description = 121_BETS1_SECTION_A_APR22_Q21]

1. $3/7$

[Option ID = 2361]

2. $1 - (6/7)^3$

[Option ID = 2362]

3. $(3/7)^3$

[Option ID = 2363]

4. $(1 - 3/7)^3$

[Option ID = 2364]

22) An aircraft circumnavigates the earth 10 km above the earth's surface. If it completes one full circle, the distance covered will be _____ greater than the circumference of the earth. (Assume earth radius is 3280 km, and $\pi = 3.14$)

[Question ID = 592][Question Description = 122_BETS1_SECTION_A_APR22_Q22]

1. 62.8 km

[Option ID = 2365]

2. 628 km

[Option ID = 2366]

3. 6280 km

[Option ID = 2367]

4. 12560 km

[Option ID = 2368]

23) A growing bacterial culture doubles in 1 hr; the increase in cell mass in 30 minutes will be:[Question ID = 593]

[Question Description = 123_BETS1_SECTION_A_APR22_Q23]

1. Zero [Option ID = 2369]

2. 50% [Option ID = 2370]

3. Less than 50% [Option ID = 2371]

4. More than 50% [Option ID = 2372]

24) Two random numbers are generated between zero and one and added. The probability that the sum of these two numbers will be between 0.5 and 1.5 is:[Question ID = 594][Question Description = 124_BETS1_SECTION_A_APR22_Q24]

1. 50% [Option ID = 2373]

2. 75% [Option ID = 2374]
3. 90% [Option ID = 2375]
4. 100% [Option ID = 2376]

25) If $2^x = 3^y = 6^z = K$, then the relationship between x , y , and z is given by:

[Question ID = 595][Question Description = 125_BETS1_SECTION_A_APR22_Q25]

1. $x+y = z$
[Option ID = 2377]
2. $xy = z$
[Option ID = 2378]
3. $1/x + 1/y = 1/z$
[Option ID = 2379]
4. $x^y = y^x = z$
[Option ID = 2380]

26) A plasmid has three sites for *EcoRI*. When digested by this enzyme, incidentally partial digestion took place, though no uncut or nicked plasmid remained in the digestion mixture. The maximum number of bands that can be visualized in an agarose gel would be:

[Question ID = 596][Question Description = 126_BETS1_SECTION_A_APR22_Q26]

1. 1
[Option ID = 2381]
2. 3
[Option ID = 2382]
3. 7
[Option ID = 2383]
4. 10
[Option ID = 2384]

27) An enzyme is governed by Michaelis-Menten Kinetics. The apparent K_M increases four fold due to the addition of inhibitor but the reaction rate declines by 50%. The substrate concentration in the reaction is:

[Question ID = 597][Question Description = 127_BETS1_SECTION_A_APR22_Q27]

1. $S = K_M$
[Option ID = 2385]
2. $S = 2 K_M$
[Option ID = 2386]
3. $S = 3 K_M$
[Option ID = 2387]
4. $S = 4 K_M$
[Option ID = 2388]

28) A culture contains two bacterial populations 'X' and 'Y' in equal proportion. On dilution plating only two colonies were obtained due to excessive dilution. The probability that one will be X and other will be Y is:[Question ID = 598][Question Description = 128_BETS1_SECTION_A_APR22_Q28]

1. 100% [Option ID = 2389]
2. 75% [Option ID = 2390]
3. 50% [Option ID = 2391]
4. 25% [Option ID = 2392]

29) For transcribing protein coding genes, the RNA Polymerase forms the preinitiation complex (PIC) in association with:

[Question ID = 599][Question Description = 129_BETS1_SECTION_A_APR22_Q29]

1. TFIIA, TFIID, TFIIG [Option ID = 2393]
2. TFIIA, TFIIG, TFIIH [Option ID = 2394]
3. TFIIH, TFIIF, TFIID [Option ID = 2395]
4. TFIIC, TFIID, TFIIF [Option ID = 2396]

30) During signal transduction, one molecule of phosphatidylinositol 4,5-bisphosphate (PIP2) is cleaved into one molecule each of inositol triphosphate (IP3) and diacylglycerol (DAG) by the enzyme:

[Question ID = 600][Question Description = 130_BETS1_SECTION_A_APR22_Q30]

1. Lipolyase C

[Option ID = 2397]

2. Phosphatase C

[Option ID = 2398]

3. Phosphodiesterase C

[Option ID = 2399]

4. Phospholipase C

[Option ID = 2400]

31) Identify the INCORRECT statement for a competitive reaction.

[Question ID = 601][Question Description = 131_BETS1_SECTION_A_APR22_Q31]

1. The V_{max} is unchanged.

[Option ID = 2401]

2. The dissociation constant (K_d) is increased.

[Option ID = 2402]

3. K_m will increase.

[Option ID = 2403]

4. The intercept on the x-axis will shift towards the left in the Lineweaver-Burk plot.

[Option ID = 2404]

32) The melting temperature (t_m) of DNA is higher when the content of:

[Question ID = 602][Question Description = 132_BETS1_SECTION_A_APR22_Q32]

1. A:T base pairs is higher.

[Option ID = 2405]

2. G:C base pairs is higher.

[Option ID = 2406]

3. A:T base pairs is same as G:C base pairs.

[Option ID = 2407]

4. G:C base pairs is lower.

[Option ID = 2408]

33) Gap junctions are absent in:[Question ID = 603][Question Description = 133_BETS1_SECTION_A_APR22_Q33]

1. Brain cells. [Option ID = 2409]

2. Cardiac muscle cells. [Option ID = 2410]

3. Liver cells. [Option ID = 2411]

4. Erythrocytes. [Option ID = 2412]

34) The enzyme that links carbon and nitrogen metabolism is:[Question ID = 604][Question Description = 134_BETS1_SECTION_A_APR22_Q34]

1. Glutamine synthetase. [Option ID = 2413]

2. Transketolase. [Option ID = 2414]

3. Glutamate dehydrogenase. [Option ID = 2415]

4. Enolase. [Option ID = 2416]

35) The cytosine residues in the DNA are methylated at specific di- or tri-nucleotide sequences. Which among these methylation motifs is predominantly found in case of protein-coding genes in animals? (H stands for A, T or C)

[Question ID = 605][Question Description = 135_BETS1_SECTION_A_APR22_Q35]

1. CpG

[Option ID = 2417]

2. CpHpG

[Option ID = 2418]

3. CpHpH

[Option ID = 2419]

4. CpGpG

[Option ID = 2420]

36) Which one of the following acts as a linker histone?[Question ID = 606][Question Description = 136_BETS1_SECTION_A_APR22_Q36]

1. H1 [Option ID = 2421]
2. H2A [Option ID = 2422]
3. H2B [Option ID = 2423]
4. H3 [Option ID = 2424]

37) If you mixed 20 mL of 50 mM sodium acetate (NaOAc) with 30 mL of 25 mM glucose, what would be the concentration of each in the final solution?

[Question ID = 607][Question Description = 137_BETS1_SECTION_A_APR22_Q37]

1. 50 mM NaOAc, 25 mM Glucose

[Option ID = 2425]

2. 20 mM NaOAc, 15 mM Glucose

[Option ID = 2426]

3. 30 mM NaOAc, 20 mM Glucose

[Option ID = 2427]

4. 40 mM NaOAc, 10 mM Glucose

[Option ID = 2428]

38) If the numerator of a fraction is increased by 15% and its denominator is decreased by 8%, the new fraction becomes $\frac{15}{16}$. Find the original fraction.[Question ID = 608][Question Description = 138_BETS1_SECTION_A_APR22_Q38]

1. $\frac{4}{3}$ [Option ID = 2429]
2. $\frac{15}{4}$ [Option ID = 2430]
3. $\frac{3}{4}$ [Option ID = 2431]
4. $\frac{4}{15}$ [Option ID = 2432]

39) Identify the sum of $a+b+c$, provided the total of each row and each column is same.

11	16	a
10	b	14
c	8	13

[Question ID = 609][Question Description = 139_BETS1_SECTION_A_APR22_Q39]

1. 32

[Option ID = 2433]

2. 36

[Option ID = 2434]

3. 27

[Option ID = 2435]

4. 30

[Option ID = 2436]

40) Add one more element to the given number series: 71, 76, 69, 74, 67, 72:[Question ID = 610][Question Description = 140_BETS1_SECTION_A_APR22_Q40]

1. 77 [Option ID = 2437]
2. 65 [Option ID = 2438]
3. 80 [Option ID = 2439]
4. 76 [Option ID = 2440]

41) If 48 men can do a piece of work in 25 hours, how much time will it take for 15 men to finish the same task?[Question ID = 611][Question Description = 141_BETS1_SECTION_A_APR22_Q41]

1. 75 hours [Option ID = 2441]
2. 60 hours [Option ID = 2442]
3. 80 hours [Option ID = 2443]
4. 85 hours [Option ID = 2444]

42) A 100 m long train is running at a speed of 68 km/h. A man is also running in the same direction with a speed of 8 km/h. In what time will the train overtake the running man?[Question ID = 612][Question Description = 142_BETS1_SECTION_A_APR22_Q42]

1. 6 sec [Option ID = 2445]
2. 9 sec [Option ID = 2446]
3. 6 min [Option ID = 2447]
4. 9 min [Option ID = 2448]

43) What will be the length of a DNA molecule containing 10 million bp?[Question ID = 613][Question Description = 143_BETS1_SECTION_A_APR22_Q43]

1. 340 mm [Option ID = 2449]
2. 34 mm [Option ID = 2450]
3. 3.4 mm [Option ID = 2451]
4. 0.34 mm [Option ID = 2452]

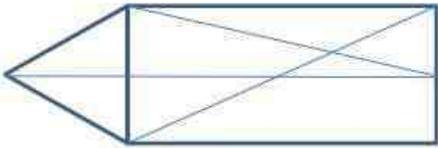
44) If 8% of $x = 4%$ of y , then 20% of x is?[Question ID = 614][Question Description = 144_BETS1_SECTION_A_APR22_Q44]

1. 10% of y [Option ID = 2453]
2. 16% of y [Option ID = 2454]
3. 80% of y [Option ID = 2455]
4. 40% of y [Option ID = 2456]

45) If $x=y^a$, $y=z^b$, $z=x^c$, find the value of abc ?[Question ID = 615][Question Description = 145_BETS1_SECTION_A_APR22_Q45]

1. 1 [Option ID = 2457]
2. 3 [Option ID = 2458]
3. 0 [Option ID = 2459]
4. Cannot be determined [Option ID = 2460]

46) Find the number of triangles in the given figure:

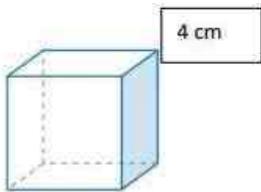


[Question ID = 616][Question Description = 146_BETS1_SECTION_A_APR22_Q46]

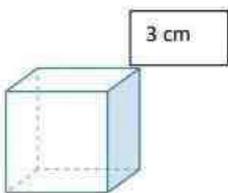
1. 12 [Option ID = 2461]
2. 13 [Option ID = 2462]
3. 14 [Option ID = 2463]
4. 15 [Option ID = 2464]

47) Which one of these cubes (labelled A - D) will have the highest surface to volume ratio? The length of sides of each cube are given in cm.

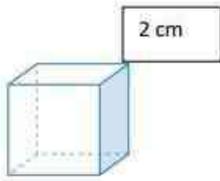
A.



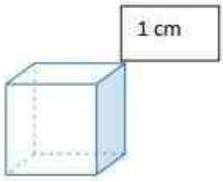
B.



C.



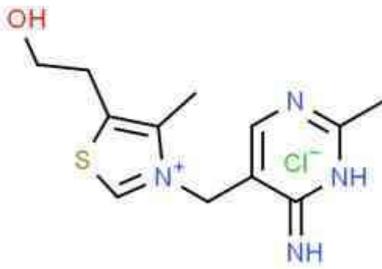
D.



[Question ID = 617][Question Description = 147_BETS1_SECTION_A_APR22_Q47]

1. A
[Option ID = 2465]
2. B
[Option ID = 2466]
3. C
[Option ID = 2467]
4. D
[Option ID = 2468]

48) What is the molecular formula for the structure given below?



[Question ID = 618][Question Description = 148_BETS1_SECTION_A_APR22_Q48]

1. $C_{12}H_{17}ClN_4OS$ [Option ID = 2469]
2. $C_{10}H_{16}ClN_4OS$ [Option ID = 2470]
3. $C_{11}H_{16}ClN_4OS$ [Option ID = 2471]
4. $C_{13}H_{16}ClN_4OS$ [Option ID = 2472]

49) In Reverse Phase chromatography of a mixture of protein and sodium chloride:[Question ID = 619][Question Description = 149_BETS1_SECTION_A_APR22_Q49]

1. The salt will elute before the protein [Option ID = 2473]
2. The salt and protein will co-elute [Option ID = 2474]
3. The salt will elute after the protein [Option ID = 2475]
4. The salt will elute but the protein will not [Option ID = 2476]

50) What is the concentration of D_2O in heavy water (density 1.11 g/ml)?

[Question ID = 620][Question Description = 150_BETS1_SECTION_A_APR22_Q50]

1. 0.5 M
[Option ID = 2477]
2. 5.0 M
[Option ID = 2478]
3. 50.0 M
[Option ID = 2479]
4. 55.5 M

[Option ID = 2480]

Topic:- BET SECTION S1 B

1) Green Fluorescent Protein (GFP) emits green light due to the presence of a:[Question ID = 621][Question Description = 151_BETS1_SECTION_B_APR22_Q51]

1. prosthetic fluorophore that emits green light. [Option ID = 2481]
2. group of amino acids that are not found in other proteins. [Option ID = 2482]
3. metal cofactor that shifts the emission to green wavelength. [Option ID = 2483]
4. post translational modification that generates a unique fluorophore. [Option ID = 2484]

2) What is the molarity of 100 g Glycine (75 Daltons) dissolved in 1 liter water?[Question ID = 622][Question Description = 152_BETS1_SECTION_B_APR22_Q52]

1. 75.0 M [Option ID = 2485]
2. 0.0133 M [Option ID = 2486]
3. 1.33 M [Option ID = 2487]
4. 10.0 M [Option ID = 2488]

3) What will be the molecular weight of the tri-peptide Trp-Gly-His?
Molecular weights of Trp, Gly, and His are 204.2, 75.07, and 155.2 respectively.

[Question ID = 623][Question Description = 153_BETS1_SECTION_B_APR22_Q53]

1. 434.47

[Option ID = 2489]

2. 300.00

[Option ID = 2490]

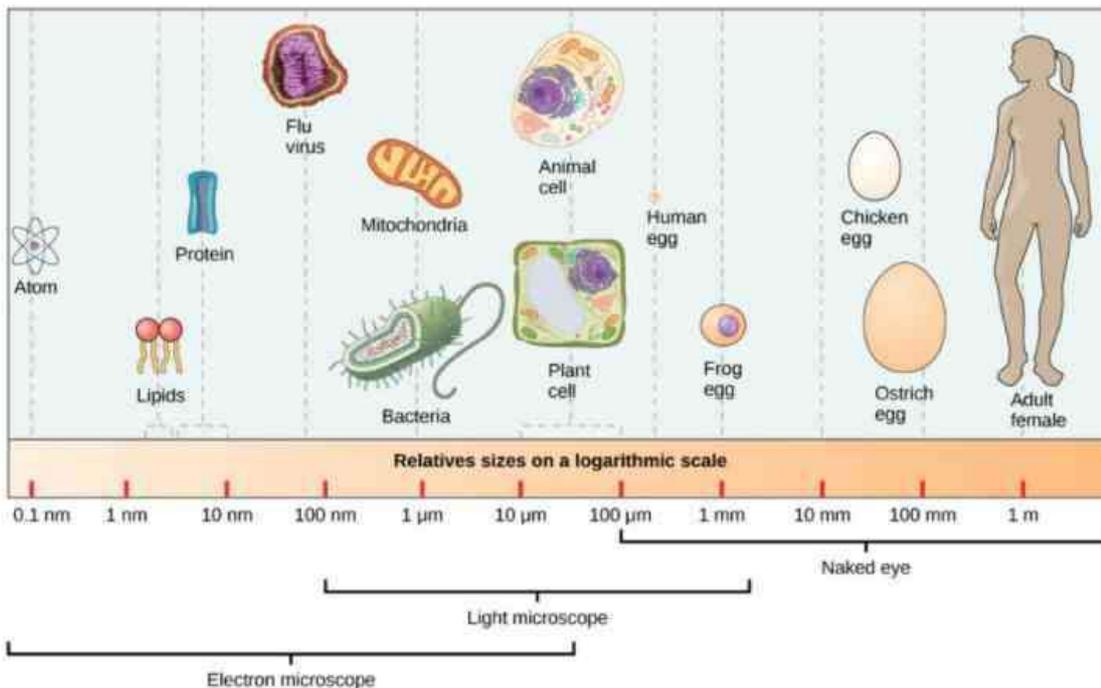
3. 398.47

[Option ID = 2491]

4. 502.25

[Option ID = 2492]

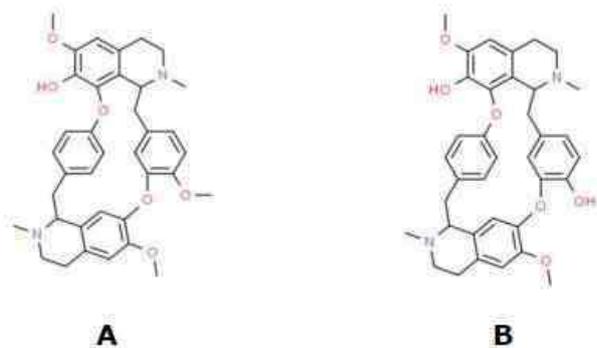
4) How many times is the Ostrich egg bigger than the mitochondrion?



[Question ID = 624][Question Description = 154_BETS1_SECTION_B_APR22_Q54]

1. 100 [Option ID = 2493]
2. 1000 [Option ID = 2494]
3. 10000 [Option ID = 2495]
4. 100000 [Option ID = 2496]

5) What, if any, is the difference between the molecular weights of molecule A (left) vs molecule B (right) ?



[Question ID = 625][Question Description = 155_BETS1_SECTION_B_APR22_Q55]

1. Molecular weight of the two are identical

[Option ID = 2497]

2. Molecular weight of A is less by 20 Daltons

[Option ID = 2498]

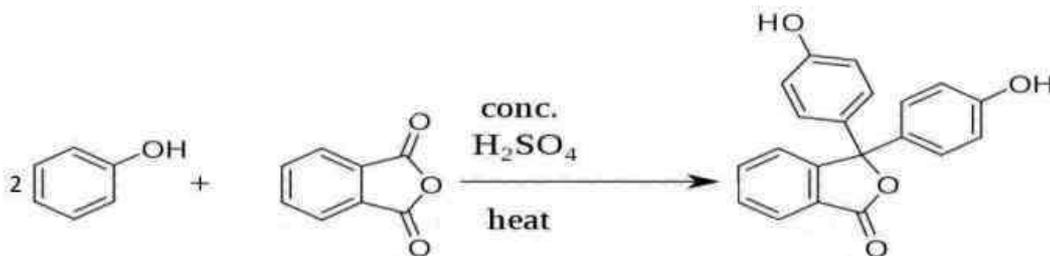
3. Molecular weight of A is more by 14 Daltons

[Option ID = 2499]

4. Molecular weight of B is more by 2 Daltons

[Option ID = 2500]

6) What may be the simplest and most inexpensive way to know that the product is formed in the reaction given below?



[Question ID = 626][Question Description = 156_BETS1_SECTION_B_APR22_Q56]

1. Mass spectrometry [Option ID = 2501]

2. Reverse Phase HPLC [Option ID = 2502]

3. CD spectroscopy [Option ID = 2503]

4. Change of color upon addition of alkali [Option ID = 2504]

7) What will be the final concentration of the solute when 10 ml of its 10 M solution is mixed with 990 ml solvent?[Question ID = 627][Question Description = 157_BETS1_SECTION_B_APR22_Q57]

1. 1 M [Option ID = 2505]

2. 0.1 M [Option ID = 2506]

3. 10 M [Option ID = 2507]

4. 0.001 M [Option ID = 2508]

8) Which enzyme will digest RNA in a DNA-RNA Hybrid?[Question ID = 628][Question Description = 158_BETS1_SECTION_B_APR22_Q58]

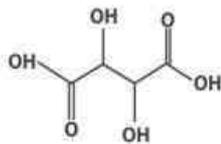
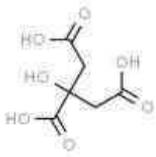
1. RNase A [Option ID = 2509]

2. BamHI [Option ID = 2510]

3. Reverse transcriptase [Option ID = 2511]

4. RNase H [Option ID = 2512]

9) How many chiral centers are there in each of these two molecules?



[Question ID = 629][Question Description = 159_BETS1_SECTION_B_APR22_Q59]

1. 1 and 1 [Option ID = 2513]
2. 1 and 2 [Option ID = 2514]
3. 2 and 2 [Option ID = 2515]
4. 4 and 3 [Option ID = 2516]

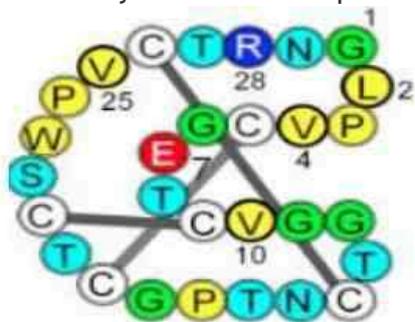
10) The CO-NH moiety between two C-alpha atoms constitutes the Peptide bond. The measured bond lengths (Angstroms) are : C(alpha)-CO (1.51); C=O (1.24); C-N(1.33); N-C(alpha)1.46. In which of these, there is a decrease from the expected bond length due to partial double bond character of the peptide bond?[Question ID = 630][Question Description = 160_BETS1_SECTION_B_APR22_Q60]

1. C(alpha)-CO [Option ID = 2517]
2. C=O [Option ID = 2518]
3. C-N [Option ID = 2519]
4. N-C(alpha) [Option ID = 2520]

11) Which one of these is a metal containing Vitamin?[Question ID = 631][Question Description = 161_BETS1_SECTION_B_APR22_Q61]

1. Vitamin C [Option ID = 2521]
2. Vitamin B1 [Option ID = 2522]
3. Vitamin B12 [Option ID = 2523]
4. Vitamin A [Option ID = 2524]

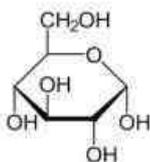
12) How many different kinds of post translational modifications are present in this peptide?



[Question ID = 632][Question Description = 162_BETS1_SECTION_B_APR22_Q62]

1. One [Option ID = 2525]
2. Two [Option ID = 2526]
3. Four [Option ID = 2527]
4. Nine [Option ID = 2528]

13) Given the molecular structure of glucose, the molecular formula and molecular weight of maltose will be:



[Question ID = 633][Question Description = 163_BETS1_SECTION_B_APR22_Q63]

1. $C_{12}H_{24}O_{12}$, 360 Daltons
[Option ID = 2529]
2. $C_{12}H_{24}O_{12}$, 460 Daltons
[Option ID = 2530]

3. $C_{12}H_{22}O_{11}$, 342 Daltons

[Option ID = 2531]

4. $C_{12}H_{22}O_{11}$, 490 Daltons

[Option ID = 2532]

14) What will be the absorbance of a 1 mM solution of molecule X whose molar extinction coefficient is $1000 \text{ M}^{-1}\text{cm}^{-1}$ & path length of the cuvette used is 1 cm? [Question ID = 634][Question Description = 164_BETS1_SECTION_B_APR22_Q64]

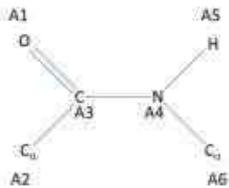
1. 1.0 [Option ID = 2533]

2. 0.1 [Option ID = 2534]

3. 0.5 [Option ID = 2535]

4. 2.0 [Option ID = 2536]

15) Amide bonds between two amino acids (as shown below) are generally in trans-conformation. The atoms are labeled as A1 through A6. The angle measured for defining the trans-conformation of the amide bond is the angle between:



[Question ID = 635][Question Description = 165_BETS1_SECTION_B_APR22_Q65]

1. the atoms A2, A3 and A4.

[Option ID = 2537]

2. the planes formed by A1,A3,A4 and A3,A4,A6.

[Option ID = 2538]

3. the planes formed by A2,A3,A4 and A6,A4,A5.

[Option ID = 2539]

4. the planes formed by A2,A3,A4 and A3,A4,A6.

[Option ID = 2540]

16) Which one of the molecular processes utilize 2', 3' Dideoxy-ribonucleoside triphosphates?

[Question ID = 636][Question Description = 166_BETS1_SECTION_B_APR22_Q66]

1. DNA synthesis for primers.

[Option ID = 2541]

2. Okazaki fragment formation during lagging strand synthesis.

[Option ID = 2542]

3. DNA sequencing by synthesis.

[Option ID = 2543]

4. Transcript chain elongation.

[Option ID = 2544]

17) Proteins are glycosylated in the endoplasmic reticulum. In the final structures, the glycan moieties are typically present:

[Question ID = 637][Question Description = 167_BETS1_SECTION_B_APR22_Q67]

1. on the surface of these proteins.

[Option ID = 2545]

2. in the core of these proteins.

[Option ID = 2546]

3. on the surface as well as in the core of these proteins.

[Option ID = 2547]

4. on the membrane inserted segments of these proteins.

[Option ID = 2548]

18) A protein with 10 lysines and 2 arginine residues was digested with trypsin and the peptide mixture was resolved on an

SDS-PAGE. After silver staining, 10 bands were detected instead of 13. Select the plausible reasons from the following:

- A. Some of the Arginines and Lysines were inside the protein core.
- B. Some of the Arginines and Lysines were followed by a Proline residue.
- C. Some of the Arginines and Lysines were followed by a negatively charged residue.
- D. Some of the Lysines were modified at the epsilon Nitrogen atom.
- E. One of the Lysine or Arginine was at the extreme C-terminus.

Choose the correct answer from the options given below:

[Question ID = 638][Question Description = 168_BETS1_SECTION_B_APR22_Q68]

1. A, B, C and D.

[Option ID = 2549]

2. A, B, C and E.

[Option ID = 2550]

3. B, C, D and E.

[Option ID = 2551]

4. A, B, D and E.

[Option ID = 2552]

19) 15 to 30% of collagen residues are 4-hydroxyproline residues (Hyp). When rats are fed with ^{14}C labeled Hyp, the collagen produced by them is not radioactive, but when they are fed with ^{14}C labeled Proline, the collagen produced is radioactive. What is the most plausible reason?

[Question ID = 639][Question Description = 169_BETS1_SECTION_B_APR22_Q69]

1. Hyp is an essential amino acid in rats.

[Option ID = 2553]

2. Free Hyp is dehydroxylated to form Proline in the rats.

[Option ID = 2554]

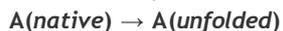
3. Proline residues are hydroxylated once they are incorporated into collagen in rats.

[Option ID = 2555]

4. Free ^{14}C labelled Hyp is degraded in rats.

[Option ID = 2556]

20) A protein completely unfolds in 8 M Urea. The stability of the folded state in water is calculated to be 8 kCal/mole at 25 °C. What is the likely ΔG of the following reaction in 8 M Urea?



Choose the correct answer:

[Question ID = 640][Question Description = 170_BETS1_SECTION_B_APR22_Q70]

1. Zero

[Option ID = 2557]

2. Less than zero

[Option ID = 2558]

3. 8^2 kcal/mole

[Option ID = 2559]

4. 8 kcal/mole

[Option ID = 2560]

21) A following reaction is occurring in a test tube:



100 nM solution of A is incubated with an equal volume of 100 nM solution of B and left at 25 °C till the equilibrium is reached. Finally, when the concentration of A is measured, it is found to be 10 nM. What is the approximate concentration of C when 2 nM solution of A is incubated with an equal volume of 100 nM solution of B under identical conditions?

Choose the correct answer:

[Question ID = 641][Question Description = 171_BETS1_SECTION_B_APR22_Q71]

1. -0.95 nM

[Option ID = 2561]

2. -0.8 nM

[Option ID = 2562]

3. -0.1 nM

[Option ID = 2563]

4. 10 nM

[Option ID = 2564]

22) A protein sample isolated from natural source was electrophoresed on a non-reducing SDS- PAGE. It migrated as a band corresponding to 60 kDa. When the same protein was electrophoresed on a native-PAGE its migration corresponded to a 120 kDa marker protein. What is a reasonable inference?

[Question ID = 642][Question Description = 172_BETS1_SECTION_B_APR22_Q72]

1. The protein is a dimer of 60 kDa subunits that are not linked with disulfides.

[Option ID = 2565]

2. The protein has two 60 kDa subunits that are linked with disulfides.

[Option ID = 2566]

3. No inference concerning protein size can be drawn since proteins don't run according to their masses in native PAGE.

[Option ID = 2567]

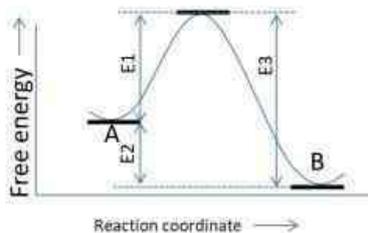
4. The protein is unusually rich in aspartic and glutamic acid.

[Option ID = 2568]

23) The energy landscape or the energy of a reaction:



Along its reaction coordinate follows the following pattern:



Which one of the following statements are true?

[Question ID = 643][Question Description = 173_BETS1_SECTION_B_APR22_Q73]

1. The rate at which A changes to B is independent of E1

[Option ID = 2569]

2. The rate at which B converts to A is determined by E3

[Option ID = 2570]

3. The rate at which A converts to B is determined by E2

[Option ID = 2571]

4. The rate at which B converts to A is independent of E3

[Option ID = 2572]

24) A laboratory is trying to purify a Histone-binding protein from its native source. Which one of the following purification techniques should be used for one-step purification of the protein?

[Question ID = 644][Question Description = 174_BETS1_SECTION_B_APR22_Q74]

1. Cation exchange chromatography

[Option ID = 2573]

2. Immuno affinity chromatography

[Option ID = 2574]

3. Gel exclusion chromatography

[Option ID = 2575]

4. Metal affinity chromatography

[Option ID = 2576]

25) A 1 M Tris-HCl (pH 8.0) solution was diluted 10 fold. What will be the pH of the resulting solution?[Question ID = 645]

[Question Description = 175_BETS1_SECTION_B_APR22_Q75]

1. 8.0 [Option ID = 2577]

2. 7.0 [Option ID = 2578]

3. 0.08 [Option ID = 2579]

4. 0.8 [Option ID = 2580]

26) When ice absorbs latent heat at a constant pressure to melt from solid to liquid state at constant temperature, which of the following changes are happening?

A. Entropy of the system is increasing.

B. C_p (heat capacity at constant pressure) of the system is infinite or undefined.

C. Enthalpy of the system is increasing.

D. C_p of the system is zero.

Choose the correct answer:

[Question ID = 646][Question Description = 176_BETS1_SECTION_B_APR22_Q76]

1. A, B, C

[Option ID = 2581]

2. A, C, D

[Option ID = 2582]

3. A, B

[Option ID = 2583]

4. C, D

[Option ID = 2584]

27) The term Dysbiosis is associated with:[Question ID = 647][Question Description = 177_BETS1_SECTION_B_APR22_Q77]

1. Kinome [Option ID = 2585]

2. Immunome [Option ID = 2586]

3. Genome [Option ID = 2587]

4. Microbiome [Option ID = 2588]

28) Which one of the immunodeficiency is caused by a mutation in *BTK* gene:

[Question ID = 648][Question Description = 178_BETS1_SECTION_B_APR22_Q78]

1. X-linked SCID

[Option ID = 2589]

2. X-linked agammaglobulinemia

[Option ID = 2590]

3. DiGeorge syndrome

[Option ID = 2591]

4. Chronic granulomatous disease

[Option ID = 2592]

29) Which one of the following Immunoglobulins cause type 1 allergic reaction?[Question ID = 649][Question Description = 179_BETS1_SECTION_B_APR22_Q79]

1. IgG [Option ID = 2593]

2. IgM [Option ID = 2594]

3. IgE [Option ID = 2595]

4. IgA [Option ID = 2596]

30) TATA box involved in the initiation of transcription is located in the:[Question ID = 650][Question Description = 180_BETS1_SECTION_B_APR22_Q80]

1. Promoter region [Option ID = 2597]

2. Enhancer region [Option ID = 2598]

3. Exon region [Option ID = 2599]

4. Intron region [Option ID = 2600]

31) Given below are two statements:

Statement I: MacConkey agar is a media used for recovery of Gram positive bacteria from mixed bacterial culture.

Statement II: The bile salts and crystal violet in MacConkey agar inhibit growth of some bacteria.

In the light of the above statements, choose the correct answer from the options given below :

[Question ID = 651][Question Description = 181_BETS1_SECTION_B_APR22_Q81]

1. Both Statement I and II are true and Statement II is the correct explanation of Statement I

[Option ID = 2601]

2. Both Statement I and II are true but Statement II is not the correct explanation of Statement I

[Option ID = 2602]

3. Statement I is true but Statement II is false

[Option ID = 2603]

4. Statement I is false but Statement II is true

[Option ID = 2604]

32) Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Mycoplasma is a bacteria without cell wall, and it stains negative in Gram staining.

Reason R: Only bacteria that have a cell wall would stain positive in Gram staining.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 652][Question Description = 182_BETS1_SECTION_B_APR22_Q82]

1. Both A and R are true and R is the correct explanation of A

[Option ID = 2605]

2. Both A and R are true but R is not the correct explanation of A

[Option ID = 2606]

3. A is true but R is false

[Option ID = 2607]

4. A is false but R is true

[Option ID = 2608]

33) Which one of the following markers is NOT routinely used for DNA fingerprinting?

[Question ID = 653][Question Description = 183_BETS1_SECTION_B_APR22_Q83]

1. Amplification short tandem repeats

[Option ID = 2609]

2. Analysis of copy number variations

[Option ID = 2610]

3. Restriction fragment length polymorphism

[Option ID = 2611]

4. Amplification variable number tandem repeats

[Option ID = 2612]

34) A specialized histone associated with the centromeric region of the chromosome is:[Question ID = 654][Question Description = 184_BETS1_SECTION_B_APR22_Q84]

1. CenH3 [Option ID = 2613]

2. H2A.Z [Option ID = 2614]

3. H3.3 [Option ID = 2615]

4. H2A.X [Option ID = 2616]

35) Which of the following are the sulfur containing amino acids?

i. Methionine

ii. Histidine

iii. Leucine

iv. Cysteine

[Question ID = 655][Question Description = 185_BETS1_SECTION_B_APR22_Q85]

1. (ii) and (i) [Option ID = 2617]
2. (i) and (iv) [Option ID = 2618]
3. (iv) and (ii) [Option ID = 2619]
4. (iii) and (ii) [Option ID = 2620]

36) DNA isolated from four unidentified species of bacteria - A, B, C and D has been estimated to have 38%, 26%, 24% and 12% thymine, respectively. One of these four species was isolated from a hot spring (64 °C). Identify the candidate which is most likely to be a thermophilic bacterium.[Question ID = 656][Question Description = 186_BETS1_SECTION_B_APR22_Q86]

1. A [Option ID = 2621]
2. B [Option ID = 2622]
3. C [Option ID = 2623]
4. D [Option ID = 2624]

37) Given below are two statements:

Statement I: Polycistronic mRNAs are found in archaea and bacteria.

Statement II: Plastid genes in eukaryotes have only mono-cistronic mRNA.

In the light of the above statements, choose the most appropriate answer from the options given below:

[Question ID = 657][Question Description = 187_BETS1_SECTION_B_APR22_Q87]

1. Both Statement I and Statement II are correct.

[Option ID = 2625]

2. Both Statement I and Statement II are incorrect.

[Option ID = 2626]

3. Statement I is correct but Statement II is incorrect.

[Option ID = 2627]

4. Statement I is incorrect but Statement II is correct.

[Option ID = 2628]

38) A conventional light microscope allows us to magnify cells up to 1000 times and to resolve details as small as _____.[Question ID = 658][Question Description = 188_BETS1_SECTION_B_APR22_Q88]

1. 200 μm [Option ID = 2629]
2. 200 nm [Option ID = 2630]
3. 0.2 nm [Option ID = 2631]
4. 20 nm [Option ID = 2632]

39) Arrange the following chemical bonds/interactions in the order of their strengths in vacuum -

Hydrogen bond, Covalent bond, van der Waals attraction and Ionic bond:

[Question ID = 659][Question Description = 189_BETS1_SECTION_B_APR22_Q89]

1. Covalent bond > Ionic bond > hydrogen bond > van der Waals attraction

[Option ID = 2633]

2. Ionic bond > Covalent bond > hydrogen bond > van der Waals attraction

[Option ID = 2634]

3. Covalent bond > Ionic bond > van der Waals attraction > hydrogen bond

[Option ID = 2635]

4. Ionic bond > Covalent bond > van der Waals attraction > hydrogen bond

[Option ID = 2636]

40) Which one of the following is NOT a major checkpoint in the cell division cycle of eukaryotic cell?

[Question ID = 660][Question Description = 190_BETS1_SECTION_B_APR22_Q90]

1. Beginning of S-phase

[Option ID = 2637]

2. Transition from S to G₂ phase

[Option ID = 2638]

3. Transition from G₂ to M phase

[Option ID = 2639]

4. Transition from Metaphase to Anaphase during Mitosis

[Option ID = 2640]

41) Which one of the following CANNOT be used for progressive global multiple sequence alignment?

[Question ID = 661][Question Description = 191_BETS1_SECTION_B_APR22_Q91]

1. ClustalW

[Option ID = 2641]

2. LALIGN

[Option ID = 2642]

3. PILEUP

[Option ID = 2643]

4. T-COFFEE

[Option ID = 2644]

42) Match the items in left column with those in the right column :

Conjugated protein	Prosthetic group
A. Casein	I. Calcium
B. Hemoglobin	II. Iron
C. Calmodulin	III. Flavin nucleotides
D. Succinate dehydrogenase	IV. Heme
E. Ferritin	V. Phosphate group

Choose the correct answer from the options given below:

[Question ID = 662][Question Description = 192_BETS1_SECTION_B_APR22_Q92]

1. A-V, B-IV, C-I, D-III, E-II

[Option ID = 2645]

2. A-III, B-IV, C-I, D-V, E-II

[Option ID = 2646]

3. A-V, B-IV, C-II, D-III, E-I

[Option ID = 2647]

4. A-III, B-IV, C-II, D-V, E-I

[Option ID = 2648]

43) Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: Histones bind to DNA with high affinity.

Reason R: Histones are small proteins rich in valine and isoleucine residues.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 663][Question Description = 193_BETS1_SECTION_B_APR22_Q93]

1. Both A and R are true and R is the correct explanation of A.

[Option ID = 2649]

2. Both A and R are true but R is not the correct explanation of A.

[Option ID = 2650]

3. A is true but R is false.

[Option ID = 2651]

4. A is false but R is true.

[Option ID = 2652]

44) The color of emitted light of Quantum dots used in fluorescence microscopy depend on:[Question ID = 664][Question Description = 194_BETS1_SECTION_B_APR22_Q94]

1. The antibody they are coupled with [Option ID = 2653]

2. The size of the nanocrystal [Option ID = 2654]

3. Time at which they are visualized [Option ID = 2655]

4. The material that coats them [Option ID = 2656]

45) Which one of the following properties of naturally occurring D-amino acids is INCORRECT:

[Question ID = 665][Question Description = 195_BETS1_SECTION_B_APR22_Q95]

1. Peptides arising from them are more susceptible to attack by peptidases.

[Option ID = 2657]

2. They are components of bacterial cell wall.

[Option ID = 2658]

3. Peptides arising from them are not synthesized by ribosomal machinery.

[Option ID = 2659]

4. They are components of many bacterially produced peptide antibiotics.

[Option ID = 2660]

46) Which one of the following will NOT change upon adding an enzyme to a chemical reaction or changing the concentration of reactants or products?

A. ΔG°

B. K_{eq}

C. ΔG

[Question ID = 666][Question Description = 196_BETS1_SECTION_B_APR22_Q96]

1. A, B

[Option ID = 2661]

2. B, C

[Option ID = 2662]

3. A, B, C

[Option ID = 2663]

4. Only A

[Option ID = 2664]

47) Which of the following statements are correct?

A. Lipid bilayer lacking proteins is highly impermeable to all the charged molecules.

B. Channels have specific binding pockets for the solute molecules they allow to pass.

C. Transporters allow solutes to cross a membrane at much slower rates than do channels.

D. The plasma membrane of many animal cells contains open K^+ channels, yet the K^+ concentration in the cytosol is much higher than outside the cell.

E. The membrane potential of an axon temporarily becomes more negative when an action potential excites it.

[Question ID = 667][Question Description = 197_BETS1_SECTION_B_APR22_Q97]

1. A, C, D

[Option ID = 2665]

2. A, C, E

[Option ID = 2666]

3. A, B, E

[Option ID = 2667]

4. B, D, E

[Option ID = 2668]

48) Which one of the following enzymes help the DNA to overcome the tension generated by the unwinding during replication?

[Question ID = 668][Question Description = 198_BETS1_SECTION_B_APR22_Q98]

1. Nickase

[Option ID = 2669]

2. Helicase

[Option ID = 2670]

3. Topoisomerase

[Option ID = 2671]

4. DNA ligase

[Option ID = 2672]

49) Which one of the following types of mutations can lead to a major change in the encoded protein?

- A. Insertion of a single nucleotide near the end of the coding sequence.
- B. Removal of a single nucleotide from the beginning of the coding sequence.
- C. Deletion of three consecutive nucleotides of a codon in the middle of the coding sequence.
- D. Deletion of four consecutive nucleotides in the middle of the coding sequence.

[Question ID = 669][Question Description = 199_BETS1_SECTION_B_APR22_Q99]

- 1. A, D [Option ID = 2673]
- 2. B, D [Option ID = 2674]
- 3. B, C [Option ID = 2675]
- 4. A, E [Option ID = 2676]

50) Which one of the following organisms is NOT an obligate intracellular parasite and, therefore, can grow on bacteriological media?

[Question ID = 670][Question Description = 200_BETS1_SECTION_B_APR22_Q100]

- 1. Mycoplasma

[Option ID = 2677]

- 2. Chlamydia

[Option ID = 2678]

- 3. Rickettsia

[Option ID = 2679]

- 4. Adenovirus

[Option ID = 2680]

51) Differential expression of the genetic material depending on its parentage of inheritance is known as:

[Question ID = 671][Question Description = 201_BETS1_SECTION_B_APR22_Q101]

- 1. Penetrance

[Option ID = 2681]

- 2. Expressivity

[Option ID = 2682]

- 3. Epistasis

[Option ID = 2683]

- 4. Genomic imprinting

[Option ID = 2684]

52) Which one of the following statements is most relevant to leishmaniasis?

[Question ID = 672][Question Description = 202_BETS1_SECTION_B_APR22_Q102]

- 1. Large domestic animals such as cattle are the principal reservoir of *L. donovani*

[Option ID = 2685]

- 2. Both visceral leishmaniasis and cutaneous leishmaniasis are transmitted by the bite of sandflies.

[Option ID = 2686]

- 3. Artemisinin is effective in the treatment of leishmaniasis.

[Option ID = 2687]

- 4. Leishmaniasis is transmitted by the bite of female *Anopheles* mosquitoes.

[Option ID = 2688]

53) Which form of the plasmodia is transmitted from mosquito to human?[Question ID = 673][Question Description = 203_BETS1_SECTION_B_APR22_Q103]

- 1. Sporozoite [Option ID = 2689]
- 2. Gametocyte [Option ID = 2690]
- 3. Merozoite [Option ID = 2691]
- 4. Hypnozoite [Option ID = 2692]

54) AIDS is caused by a human retrovirus that kills:[Question ID = 674][Question Description = 204_BETS1_SECTION_B_APR22_Q104]

- 1. B lymphocytes [Option ID = 2693]
- 2. Lymphocytes stem cells [Option ID = 2694]

3. CD4-positive T-lymphocytes [Option ID = 2695]
4. CD8-positive T-lymphocytes [Option ID = 2696]

55) Latency is a characteristic of which one of the following viruses?

[Question ID = 675][Question Description = 205_BETS1_SECTION_B_APR22_Q105]

1. Herpes virus
[Option ID = 2697]
2. Polio virus
[Option ID = 2698]
3. Rhino virus
[Option ID = 2699]
4. Influenza virus
[Option ID = 2700]

56) Which one of the following is the drug of choice for sexually transmitted diseases urethritis and cervicitis caused by *Chlamydia trachomatis*?

[Question ID = 676][Question Description = 206_BETS1_SECTION_B_APR22_Q106]

1. Ampicillin
[Option ID = 2701]
2. Ciprofloxacin
[Option ID = 2702]
3. Rifampin
[Option ID = 2703]
4. Azithromycin
[Option ID = 2704]

57) Which one of the following is the most accurate statement regarding giardiasis?[Question ID = 677][Question Description = 207_BETS1_SECTION_B_APR22_Q107]

1. The drug of choice for giardiasis is chloroquine. [Option ID = 2705]
2. *Giardia lamblia* produces an enterotoxin that increases cAMP within the enterocyte, resulting in diarrhea. [Option ID = 2706]
3. *Giardia lamblia* infection is acquired by ingestion of food or water contaminated with human feces only (i.e. there is no animal reservoir for this organism). [Option ID = 2707]
4. Infection by *Giardia lamblia* occurs principally in the small intestine frequently resulting in the malabsorption of protein and fat. [Option ID = 2708]

58) T- cell clones in an individual recognize peptides only when bound and displayed by that individual's MHC molecules on the surface of antigen presenting cells. This process is known as:[Question ID = 678][Question Description = 208_BETS1_SECTION_B_APR22_Q108]

1. MHC selection [Option ID = 2709]
2. MHC restriction [Option ID = 2710]
3. MHC interaction [Option ID = 2711]
4. MHC display [Option ID = 2712]

59) A bacterial signaling system that regulates population density-dependent gene expression using secreted chemical signals is known as :

[Question ID = 679][Question Description = 209_BETS1_SECTION_B_APR22_Q109]

1. G protein-coupled receptor signalling
[Option ID = 2713]
2. Quorum sensing
[Option ID = 2714]
3. Receptor-mediated signalling
[Option ID = 2715]
4. Two component system
[Option ID = 2716]

60) A probiotic is a live microorganism that is claimed to confer a health benefit by altering the indigenous microflora of the intestinal tract. Which one of the following bacteria has been used widely in probiotics?

[Question ID = 680][Question Description = 210_BETS1_SECTION_B_APR22_Q110]

1. *Klebsiella pneumoniae*

[Option ID = 2717]

2. *Pseudomonas putida*

[Option ID = 2718]

3. *Lactobacillus lactis*

[Option ID = 2719]

4. *Escherichia coli*

[Option ID = 2720]

61) Match items in List I with items in List II.

List1	List2
A. Down Syndrome	I. Trisomy 18
B. Edward Syndrome	II. XXY
C. Klinefelter Syndrome	III. Female with one X
D. Turner Syndrome	IV. XX+21

Choose the correct answer from the options given below:

[Question ID = 681][Question Description = 211_BETS1_SECTION_B_APR22_Q111]

1. A-I, B-IV, C-II, D-III

[Option ID = 2721]

2. A-IV, B-II, C-III, D-I

[Option ID = 2722]

3. A-IV, B-I, C-II, D-III

[Option ID = 2723]

4. A-III, B-I, C-IV, D-II

[Option ID = 2724]

62) The animal embryonic stem cells that can differentiate into any embryonic cell type are known as:[Question ID = 682]

[Question Description = 212_BETS1_SECTION_B_APR22_Q112]

1. Pluripotent stem cells [Option ID = 2725]

2. Multipotent stem cells [Option ID = 2726]

3. Oligopotent stem cells [Option ID = 2727]

4. Unipotent stem cells [Option ID = 2728]

63) RTS,S vaccine for malaria consists of the central repeat (R) region derived from *Plasmodium falciparum* circumsporozoite protein (CSP) that is genetically fused to the T-cell epitope (T) and surface antigen (S) regions derived from:

[Question ID = 683][Question Description = 213_BETS1_SECTION_B_APR22_Q113]

1. Vaccinia virus

[Option ID = 2729]

2. Hepatitis B virus

[Option ID = 2730]

3. Adenovirus

[Option ID = 2731]

4. Influenza virus

[Option ID = 2732]

64) Short Chain variable fragments (ScFv) of antibody are composed of :

[Question ID = 684][Question Description = 214_BETS1_SECTION_B_APR22_Q114]

1. V_H and V_L domains with C_H domain

[Option ID = 2733]

2. V_H and V_L domains along with Fc region

[Option ID = 2734]

3. V_H and V_L domains

[Option ID = 2735]

4. Only Complementarity Determining Regions

[Option ID = 2736]

65) Protein A used for the purification of IgG is isolated from:[Question ID = 685][Question Description = 215_BETS1_SECTION_B_APR22_Q115]

1. *Staphylococcus aureus* [Option ID = 2737]
2. *Streptomyces lividans* [Option ID = 2738]
3. *Streptomyces pyogenes* [Option ID = 2739]
4. *Staphylococcus carnosus* [Option ID = 2740]

66) In a neuronal culture experiment, the effect of a chemical (under study) was prevented by pretreating the cells with prazosin, an alpha1 adrenoceptor antagonist but not by propranolol, a beta adrenoceptor antagonist. The chemical under study is likely to be:

[Question ID = 686][Question Description = 216_BETS1_SECTION_B_APR22_Q116]

1. Acetylcholine or carbachol
[Option ID = 2741]
2. Orexin or serotonin
[Option ID = 2742]
3. GABA or glutamate
[Option ID = 2743]
4. Noradrenaline or methoxamine
[Option ID = 2744]

67) Which one of the following is NOT applicable for a chemical synapse?

[Question ID = 687][Question Description = 217_BETS1_SECTION_B_APR22_Q117]

1. Usually synaptic cleft is approx. 20 - 40 nm.
[Option ID = 2745]
2. May release excitatory or inhibitory neurotransmitter.
[Option ID = 2746]
3. Cannot modulate signal intensity.
[Option ID = 2747]
4. There is a delay of signal propagation.
[Option ID = 2748]

68) Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R

Assertion A: Heating of preoptic anterior hypothalamic area of the brain caused profuse sweating and dilation of blood vessels of the skin.

Reason R: The above (in A) is to absorb more heat into the body and throw out waste from the body.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 688][Question Description = 218_BETS1_SECTION_B_APR22_Q118]

1. Both A and R are correct and R is the correct explanation of A
[Option ID = 2749]
2. Both A and R are correct but R is not the correct explanation of A
[Option ID = 2750]
3. A is correct but R is incorrect
[Option ID = 2751]
4. A is incorrect but R is correct
[Option ID = 2752]

69) Sleep loss may induce:[Question ID = 689][Question Description = 219_BETS1_SECTION_B_APR22_Q119]

1. increased learning ability and increased body weight. [Option ID = 2753]
2. increased memory loss and reduced infection. [Option ID = 2754]
3. increased memory retention, increased infection and reduced cognitive ability. [Option ID = 2755]
4. increased memory loss, compromised immune system, and decreased cognitive ability. [Option ID = 2756]

70) Which one of the following is NOT a function of the glial cells in the brain?

[Question ID = 690][Question Description = 220_BETS1_SECTION_B_APR22_Q120]

1. Transporting neurotransmitter vesicles from soma to terminal.

[Option ID = 2757]

2. Directing axons to their targets.

[Option ID = 2758]

3. Promoting the survival of nascent neurons.

[Option ID = 2759]

4. Forming the synapse.

[Option ID = 2760]

71) Skotomorphogenesis is characterized by:[Question ID = 691][Question Description = 221_BETS1_SECTION_B_APR22_Q121]

1. Small and closed cotyledons and elongated hypocotyl [Option ID = 2761]

2. Fully open cotyledons [Option ID = 2762]

3. Robust foliage and root growth [Option ID = 2763]

4. Early flowering resulting from short-day conditions [Option ID = 2764]

72) *Nod* gene products:[Question ID = 692][Question Description = 222_BETS1_SECTION_B_APR22_Q122]

1. function as receptors of certain flavonoids [Option ID = 2765]

2. lack the ability to activate the expression of other Nod factors [Option ID = 2766]

3. cause activation of homeobox genes [Option ID = 2767]

4. are involved in photosynthesis [Option ID = 2768]

73) The ligand binding domain of a ligand gated channel (LGC) has a serine residue, phosphorylation of which is essential for ligand binding. By site directed mutagenesis it was replaced by aspartic acid. The likely consequences will be:

[Question ID = 693][Question Description = 223_BETS1_SECTION_B_APR22_Q123]

1. LGC becomes non-functional

[Option ID = 2769]

2. LGC becomes constitutively active

[Option ID = 2770]

3. No change in function

[Option ID = 2771]

4. It will rapidly shift between active and inactive forms

[Option ID = 2772]

74) Cryptochromes control photomorphogenesis in response to:[Question ID = 694][Question Description = 224_BETS1_SECTION_B_APR22_Q124]

1. Red light [Option ID = 2773]

2. Far-red light [Option ID = 2774]

3. Infra-red light [Option ID = 2775]

4. Blue and UV-A light [Option ID = 2776]

75) Which one among the following is an important constituent of RNA induced silencing complex in plants?

[Question ID = 695][Question Description = 225_BETS1_SECTION_B_APR22_Q125]

1. Argonaute

[Option ID = 2777]

2. LHP1

[Option ID = 2778]

3. RNaseP

[Option ID = 2779]

4. RNA dependent RNA polymerase

[Option ID = 2780]

76) miRNAs are major regulators of gene expression. In an experiment, it was observed that gene 'X' is a direct target of miRNA 'A'. Upon overexpression of miRNA 'A' in *Arabidopsis thaliana*:

[Question ID = 696][Question Description = 226_BETS1_SECTION_B_APR22_Q126]

1. only transcript abundance of X will be affected

[Option ID = 2781]

2. the resultant protein X will be of smaller size

[Option ID = 2782]

3. only specific activity of protein X will get reduced

[Option ID = 2783]

4. both transcript and protein abundance of X may get reduced

[Option ID = 2784]

77) VirA and VirG form a two component signaling system during Agrobacterium infection in plants. In an experiment, VirG was mutated resulting in nonfunctional VirG protein. Which one of the following consequences is most likely?

[Question ID = 697][Question Description = 227_BETS1_SECTION_B_APR22_Q127]

1. Signaling leading to successful Agrobacterium infection will not be affected

[Option ID = 2785]

2. Phenolic signal will be perceived but not transduced

[Option ID = 2786]

3. Phenolic signal will not be perceived

[Option ID = 2787]

4. VirD1 will take over the function of VirG

[Option ID = 2788]

78) One centimorgan is defined as the genetic distance between two loci with a statistically corrected recombination frequency of:[Question ID = 698][Question Description = 228_BETS1_SECTION_B_APR22_Q128]

1. 0.1% [Option ID = 2789]

2. 0.5% [Option ID = 2790]

3. 1.0% [Option ID = 2791]

4. 5.0% [Option ID = 2792]

79) Which one of the following genes can be used to generate male sterile crop plants?[Question ID = 699][Question Description = 229_BETS1_SECTION_B_APR22_Q129]

1. Barnase [Option ID = 2793]

2. Bar [Option ID = 2794]

3. Lectinase [Option ID = 2795]

4. Chalcone Synthase [Option ID = 2796]

80) Which one among the following is the correct function of leghaemoglobin?

[Question ID = 700][Question Description = 230_BETS1_SECTION_B_APR22_Q130]

1. It sequesters oxygen to facilitate nitrogen fixation

[Option ID = 2797]

2. It protects nitrogenase from CO₂

[Option ID = 2798]

3. It facilitates the supply of CO₂ to nitrogen fixing bacteria

[Option ID = 2799]

4. It binds to nitrogen and moves it out of the nodule

[Option ID = 2800]

81) Which one of the following is commonly used as a selection marker for developing transgenic plants?[Question ID = 701][Question Description = 231_BETS1_SECTION_B_APR22_Q131]

1. Green fluorescent protein [Option ID = 2801]

2. B-lactamase [Option ID = 2802]

3. B-galactosidase [Option ID = 2803]

4. Hygromycin phosphotransferase [Option ID = 2804]

82) In plants, the overexpression of lectin genes confers resistance to:[Question ID = 702][Question Description = 232_BETS1_SECTION_B_APR22_Q132]

1. Virus [Option ID = 2805]

2. Insects [Option ID = 2806]

3. Fungus [Option ID = 2807]

4. Bacteria [Option ID = 2808]

83) A spectrum that depicts the magnitude of response of a biological system to light as a function of wavelength is called:

[Question ID = 703][Question Description = 233_BETS1_SECTION_B_APR22_Q133]

1. Action spectrum [Option ID = 2809]
2. Absorption spectrum [Option ID = 2810]
3. Visible spectrum [Option ID = 2811]
4. Hypothetical spectrum [Option ID = 2812]

84) In a metabolic engineering experiment the flux from primary carbon metabolism was diverted towards methylerythritol phosphate (MEP) pathway. Which one of the following class of secondary carbon compounds do you think will accumulate more?

[Question ID = 704][Question Description = 234_BETS1_SECTION_B_APR22_Q134]

1. Alkaloids [Option ID = 2813]
2. Glucosinolates [Option ID = 2814]
3. Phenolics [Option ID = 2815]
4. Terpenes [Option ID = 2816]

85) A haploid sperm from one species and a haploid egg from another species may form a diploid interspecies hybrid.

Meiosis in these plants generally fails but can also lead to rare duplicated gametes called:[Question ID = 705][Question Description = 235_BETS1_SECTION_B_APR22_Q135]

1. Allopolyploid [Option ID = 2817]
2. Aneuploid [Option ID = 2818]
3. Autopolyploid [Option ID = 2819]
4. Heteropolyploid [Option ID = 2820]

86) Which one of the following is NOT a typical feature of the hypersensitive response observed in plants during the attack of invading microbes?

[Question ID = 706][Question Description = 236_BETS1_SECTION_B_APR22_Q136]

1. Onset of programmed cell death in the region surrounding the infection site
[Option ID = 2821]
2. Rapid accumulation of reactive oxygen species
[Option ID = 2822]
3. Rapid spike in photosynthetic rate
[Option ID = 2823]
4. Rapid spike in nitric oxide production accompanying the oxidative burst
[Option ID = 2824]

87) Given below are two statements:

Statement I: Large subunit of rubisco is encoded by chloroplast genome while small subunit of Rubisco is encoded by nuclear genome

Statement II: Small subunit of rubisco has a transit peptide, which is cleaved off at the time of its translocation into plastids.

Choose the correct answer from the options given below:

[Question ID = 707][Question Description = 237_BETS1_SECTION_B_APR22_Q137]

1. Both Statement I and Statement II are true
[Option ID = 2825]
2. Both Statement I and Statement II are false
[Option ID = 2826]
3. Statement I is true but Statement II is false
[Option ID = 2827]
4. Statement I is false but Statement II is true
[Option ID = 2828]

88) The most likely sub-cellular localization of NAC transcription factors is:[Question ID = 708][Question Description = 238_BETS1_SECTION_B_APR22_Q138]

1. Nucleus [Option ID = 2829]
2. Cytoplasm [Option ID = 2830]
3. Mitochondria [Option ID = 2831]
4. Plastid [Option ID = 2832]

89) In a plant transformation vector, the selectable marker gene is ideally located next to the “left border” of T-DNA

region, because:

- A. Left border of T-DNA enters last into the plant cell.
- B. Right border of T-DNA enters last into the plant cell.
- C. It ensures complete transfer of T-DNA into the plant cell.

Choose the most appropriate answer from the options given below:

[Question ID = 709][Question Description = 239_BETS1_SECTION_B_APR22_Q139]

1. A and B Only

[Option ID = 2833]

2. B and C Only

[Option ID = 2834]

3. A and C Only

[Option ID = 2835]

4. C Only

[Option ID = 2836]

90) Given below are two statements one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: Phosphomannose isomerase (PMI) from *E. coli* was used as selection marker to develop 'golden rice 2'.

Reason R: When mannose is added in the selection media, endogenous hexokinase converts mannose into mannose-6-phosphate which blocks glycolysis, ATP production, and represses transcription of photosynthetic genes, resulting in slower growth of non-transformed plants. PMI, on the other hand, converts mannose-6-phosphate to fructose-6-phosphate.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 710][Question Description = 240_BETS1_SECTION_B_APR22_Q140]

1. Both A and R are true and R is the correct explanation of A

[Option ID = 2837]

2. Both A and R are true but R is not the correct explanation of A

[Option ID = 2838]

3. A is true but R is false

[Option ID = 2839]

4. A is false but R is true

[Option ID = 2840]

91) If an enzyme is NOT damaged during the process of entrapment in a bead, then internal pore diffusion will:

[Question ID = 711][Question Description = 241_BETS1_SECTION_B_APR22_Q141]

1. Change the observed V_{max} only

[Option ID = 2841]

2. Change the observed K_m only

[Option ID = 2842]

3. Change both the V_{max} and K_m

[Option ID = 2843]

4. Both the observed V_m and K_m will remain unchanged

[Option ID = 2844]

92) In an external recycle reactor (CSTR with external recycle), the outlet stream is concentrated 20 fold with respect to biomass and half of this concentrated cells is fed back into the reactor.

In such a situation, washout will take place when dilution rate (D) - [Question ID = 712][Question Description = 242_BETS1_SECTION_B_APR22_Q142]

1. is equal to μ_{max} [Option ID = 2845]

2. is around $2 \mu_{max}$ [Option ID = 2846]

3. is around $0.5 \mu_{max}$ [Option ID = 2847]

4. Washout will never take place [Option ID = 2848]

93) A concentrated feed of substrate is added at a constant rate in a fed-batch reactor. If all the substrate is utilized, the specific growth rate (μ) pattern will be:

[Question ID = 713][Question Description = 243_BETS1_SECTION_B_APR22_Q143]

1. Exponential growth with constant μ
[Option ID = 2849]
2. Exponential growth with increasing μ
[Option ID = 2850]
3. Growth with decreasing μ
[Option ID = 2851]
4. Growth with fluctuating μ
[Option ID = 2852]

94) For Bingham Plastics and pseudo plastic liquids, the apparent viscosity:

[Question ID = 714][Question Description = 244_BETS1_SECTION_B_APR22_Q144]

1. Increases with increase in shear force
[Option ID = 2853]
2. Decreases with increase in shear force
[Option ID = 2854]
3. Remains constant with increase in shear force
[Option ID = 2855]
4. Changes in an unpredictable fashion with change in shear force
[Option ID = 2856]

95) Given below are two statements one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : In size exclusion chromatography, larger proteins elute earlier and smaller proteins elute later.

Reason R : When matrices like sephadex are used, the partitioning of protein molecules between liquid and solid phases is a function of protein size.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 715][Question Description = 245_BETS1_SECTION_B_APR22_Q145]

1. Both A and R are true and R is the correct explanation of A
[Option ID = 2857]
2. Both A and R are true and R is not the correct explanation of A
[Option ID = 2858]
3. A is true but R is false
[Option ID = 2859]
4. A is false but R is true
[Option ID = 2860]

96) You wish to reduce the maximum shear rate in your reactor (given by impeller tip speed), without changing the power consumption (agitator power). For this, you will:[Question ID = 716][Question Description = 246_BETS1_SECTION_B_APR22_Q146]

1. Increase the diameter of impeller and reduce the RPM [Option ID = 2861]
2. Reduce the diameter of impeller and increase the RPM [Option ID = 2862]
3. Reduce RPM only [Option ID = 2863]
4. Reduce diameter of impeller only [Option ID = 2864]

97) An exponentially increasing feed of concentrated substrate is fed into a fed batch reactor to maintain a constant specific growth rate 0.35 h^{-1} . If the feed is 5 ml/hr at time, $t = 0$, then feed after 4 hrs will be approximately:

[Question ID = 717][Question Description = 247_BETS1_SECTION_B_APR22_Q147]

1. 5 ml/hr
[Option ID = 2865]
2. 10 ml/hr
[Option ID = 2866]
3. 20 ml/hr
[Option ID = 2867]
4. 80 ml/hr

[Option ID = 2868]

98) Yeast cells are immobilized in a column and glucose is fed through the inlet at a concentration of 90 g/l. If all the glucose is consumed and we can treat this as an anaerobic fermentation with negligible cell growth, then the ethanol concentration at the outlet will be:

[Question ID = 718][Question Description = 248_BETS1_SECTION_B_APR22_Q148]

1. 90 g/l

[Option ID = 2869]

2. 60 g/l

[Option ID = 2870]

3. 36 g/l

[Option ID = 2871]

4. 46 g/l

[Option ID = 2872]

99) In an ideal Continuous Stirred Tank Reactor (CSTR) at steady state:[Question ID = 719][Question Description = 249_BETS1_SECTION_B_APR22_Q149]

1. All particles have the same residence time. [Option ID = 2873]

2. Particles which enter the reactor earlier have a higher probability of leaving than those that enter later. [Option ID = 2874]

3. Particles which enter the reactor later have a higher probability of leaving than those that enter earlier. [Option ID = 2875]

4. All the particles have equal probability of leaving, independent of their time of entry into the reactor. [Option ID = 2876]

100) A continuous reactor has a productivity of 0.5 g/l/h. The volume of reactor required to produce 1.2 ton/day of the product is:

[Question ID = 720][Question Description = 250_BETS1_SECTION_B_APR22_Q150]

1. 100 L

[Option ID = 2877]

2. 1 m³

[Option ID = 2878]

3. 10 m³

[Option ID = 2879]

4. 100 m³

[Option ID = 2880]

101) If the respiratory quotient (R.Q.) for growing cells is 1.1 and the exit gas analyzer of a bioreactor shows 3% CO₂ in the outlet gases; then given normal air as input to the reactor, you expect the outlet O₂ concentration to read approximately:

[Question ID = 721][Question Description = 251_BETS1_SECTION_B_APR22_Q151]

1. 3.3% [Option ID = 2881]

2. 2.7% [Option ID = 2882]

3. 18.3% [Option ID = 2883]

4. 17.7% [Option ID = 2884]

102) If in a bioreactor, the gas hold up (ϵ) is 0.1 and the average diameter of the air bubbles is 1 mm; then the interfacial area (of the air bubble - liquid interface), per unit reactor volume is:

[Question ID = 722][Question Description = 252_BETS1_SECTION_B_APR22_Q152]

1. 6000 cm³/l

[Option ID = 2885]

2. 600 cm³/l

[Option ID = 2886]

3. 60 cm³/l

[Option ID = 2887]

4. 6 cm³/l

[Option ID = 2888]

103) A Continuous Stirred Tank Reactor (CSTR) is running at a dilution (D) of 0.3 h^{-1} and the product formed is growth associated with $Y_{P/X} = 0.2 \text{ g/g}$. In order to obtain productivity = $1.2 \text{ g l}^{-1} \text{ h}^{-1}$ we need to have at steady state a biomass concentration of:[Question ID = 723][Question Description = 253_BETS1_SECTION_B_APR22_Q153]

1. 0.8 g/l [Option ID = 2889]
2. 1.8 g/l [Option ID = 2890]
3. 0.072 g/l [Option ID = 2891]
4. 20 g/l [Option ID = 2892]

104) In an enzyme catalyzed reaction following Michaelis-Menten kinetics, both the enzyme amount and substrate (S) are doubled and we observe that the reaction rate is also doubled. From this, we can conclude that:

[Question ID = 724][Question Description = 254_BETS1_SECTION_B_APR22_Q154]

1. Enzyme amount has no effect on enzyme kinetics

[Option ID = 2893]

2. The substrate is toxic to enzyme

[Option ID = 2894]

3. Initial substrate (S) concentration $\ll K_m$

[Option ID = 2895]

4. Initial substrate (S) concentration $\gg K_m$

[Option ID = 2896]

105) A diafiltration process is used to remove salts from a protein solution of 1L. After 1L of make-up buffer (without salts) has been added to this system, the residual salt concentration would be _____ of the original.[Question ID = 725]

[Question Description = 255_BETS1_SECTION_B_APR22_Q155]

1. 50% [Option ID = 2897]
2. 36% [Option ID = 2898]
3. 10% [Option ID = 2899]
4. 5% [Option ID = 2900]

106) Penicillin titers have been increased more than 1000 fold by classical mutagenesis from the original Fleming strain. The reason behind this increase in the titer is:

[Question ID = 726][Question Description = 256_BETS1_SECTION_B_APR22_Q156]

1. Increase in the promoter strength of the penicillin encoding genes

[Option ID = 2901]

2. Increase in the stability of the mRNA of these genes

[Option ID = 2902]

3. Increase in the stability of the proteins encoded by these genes

[Option ID = 2903]

4. Removal of the regulatory controls in the penicillin pathway

[Option ID = 2904]

107) In a batch culture of cells following Monod Kinetics, the declining log phase lasts longer when:[Question ID = 727]

[Question Description = 257_BETS1_SECTION_B_APR22_Q157]

1. Initial substrate concentration is high [Option ID = 2905]
2. Initial substrate concentration is low [Option ID = 2906]
3. K_s values are large [Option ID = 2907]
4. K_s values are small [Option ID = 2908]

108) The entropy of a growing cell does NOT keep increasing continuously because:

[Question ID = 728][Question Description = 258_BETS1_SECTION_B_APR22_Q158]

1. The cell is a highly structured system

[Option ID = 2909]

2. The information content in the DNA is very high

[Option ID = 2910]

3. Various regulatory loops provide feedback to the system

[Option ID = 2911]

4. The cell is an open system allowing both matter and energy to be exchanged with surroundings

[Option ID = 2912]

109) For determining V_m and K_m of an enzyme catalyzed reaction, we often use a double reciprocal plot of $1/v$ versus $1/s$. This is NOT the best method because:

[Question ID = 729][Question Description = 259_BETS1_SECTION_B_APR22_Q159]

1. Errors in measurement are not normally distributed

[Option ID = 2913]

2. A straight line fit does not minimize the error

[Option ID = 2914]

3. Errors increase for larger values of v & s

[Option ID = 2915]

4. Errors increase for smaller values of v & s

[Option ID = 2916]

110) For monoclonal antibody production, mammalian expression systems are preferred over bacterial expression systems, primarily because:[Question ID = 730][Question Description = 260_BETS1_SECTION_B_APR22_Q160]

1. mammalian cultures have better productivity [Option ID = 2917]

2. mammalian cultures produce extra-cellular product simplifying the purification steps [Option ID = 2918]

3. mammalian system provide necessary post-translational modifications [Option ID = 2919]

4. mammalian genes can only be expressed in mammalian systems [Option ID = 2920]

111) Yeast cells obtained from batch fermentation can be reutilized for the production of:

[Question ID = 731][Question Description = 261_BETS1_SECTION_B_APR22_Q161]

1. Beer

[Option ID = 2921]

2. Trypsin

[Option ID = 2922]

3. Chloramphenicol

[Option ID = 2923]

4. Acetic acid

[Option ID = 2924]

112) Which one of the following is NOT a food rich in Vitamin A?

[Question ID = 732][Question Description = 262_BETS1_SECTION_B_APR22_Q162]

1. Potato

[Option ID = 2925]

2. Squash

[Option ID = 2926]

3. Sweet potato

[Option ID = 2927]

4. Spinach

[Option ID = 2928]

113) The principle microorganism for yogurt is:

[Question ID = 733][Question Description = 263_BETS1_SECTION_B_APR22_Q163]

1. *Streptococcus thermophilus*

[Option ID = 2929]

2. *Lactobacillus acidophilus*

[Option ID = 2930]

3. *Streptococcus lactis*

[Option ID = 2931]

4. *Leuconostoc citrovorum*

[Option ID = 2932]

114) The red color of beetroot is due to the presence of:[Question ID = 734][Question Description = 264_BETS1_SECTION_B_APR22_Q164]

1. Betalains [Option ID = 2933]

2. Anthocyanins [Option ID = 2934]

3. Flavonoids [Option ID = 2935]
4. Carotenoids [Option ID = 2936]

115) Commercial production of citric acid is done by fermentation using:[Question ID = 735][Question Description = 265_BETS1_SECTION_B_APR22_Q165]

1. *Aspergillus niger* [Option ID = 2937]
2. *Clostridium butyricum* [Option ID = 2938]
3. *Saccharomyces cerevisiae* [Option ID = 2939]
4. *Lactobacillus acidophilus* [Option ID = 2940]

116) Given below are two statements one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: The dot matrix method of sequence alignment is a very basic method that should be used first, before other more complex methods.

Reason R: The diagonal Dot Matrix Display can readily reveal presence of insertions/deletions and direct and inverted repeats that are more difficult to find by the other, more automated methods.

In the light of the above statements, choose the most appropriate answer from the options given below:

[Question ID = 736][Question Description = 266_BETS1_SECTION_B_APR22_Q166]

1. Both A and R are correct and R is the correct explanation of A
[Option ID = 2941]
2. Both A and R are correct but R is not the correct explanation of A
[Option ID = 2942]
3. A is correct but R is not correct
[Option ID = 2943]
4. A is not correct but R is correct
[Option ID = 2944]

117) Given below are two statements:

Statement I: An alignment is generated by starting at the ends of the two sequences and attempting to match all possible pairs of characters between the sequences and by following a scoring scheme for matches, mismatches, and gaps.

Statement II: For proteins, an amino acid substitution matrix, such as the Dayhoff percent accepted mutation matrix 250 (PAM250) or Blosum substitution matrix 62 (BLOSUM62) is used to score matches and mismatches.

In the light of the above statements, choose the most appropriate answer from the options given below:

[Question ID = 737][Question Description = 267_BETS1_SECTION_B_APR22_Q167]

1. Both Statement I and Statement II are correct
[Option ID = 2945]
2. Both Statement I and Statement II are incorrect
[Option ID = 2946]
3. Statement I is correct but Statement II is incorrect
[Option ID = 2947]
4. Statement I is incorrect but Statement II is correct
[Option ID = 2948]

118) Given below are two statements:

Statement I: RNA secondary structure is composed primarily of double-stranded RNA regions formed by folding of the single-stranded molecule back on itself.

Statement II: Like protein secondary structure, RNA secondary structure can be conveniently viewed as an intermediate step in the formation of a three-dimensional structure.

In the light of the above statements, choose the most appropriate answer from the options given below

[Question ID = 738][Question Description = 268_BETS1_SECTION_B_APR22_Q168]

1. Both Statement I and Statement II are correct
[Option ID = 2949]
2. Both Statement I and Statement II are incorrect

[Option ID = 2950]

3. Statement I is correct but Statement II is incorrect

[Option ID = 2951]

4. Statement I is incorrect but Statement II is correct

[Option ID = 2952]

119) A protein sequence has twenty consecutive hydrophobic amino acids followed by a few hydrophilic residues and this pattern repeats itself five to seven times. Which kind of a protein is described here? [Question ID = 739][Question Description = 269_BETS1_SECTION_B_APR22_Q169]

1. A secretory protein [Option ID = 2953]
2. A transmembrane protein [Option ID = 2954]
3. A cytoplasmic soluble enzyme [Option ID = 2955]
4. A ribosomal protein [Option ID = 2956]

120) Which one of the following DOES NOT represent known interactions of RNA secondary structural elements?

[Question ID = 740][Question Description = 270_BETS1_SECTION_B_APR22_Q170]

1. Pseudo knot

[Option ID = 2957]

2. Kissing hairpins

[Option ID = 2958]

3. Hairpin-bulge contact

[Option ID = 2959]

4. Helix-turn-helix

[Option ID = 2960]

121) Which one of the following can be considered as a Data Matrix?[Question ID = 741][Question Description = 271_BETS1_SECTION_B_APR22_Q171]

1. Your weight in kg [Option ID = 2961]
2. Marks and ages of students in a classroom [Option ID = 2962]
3. Name of a pet [Option ID = 2963]
4. A list of things to do [Option ID = 2964]

122) Which one of the following can be considered as an Atomic Vector?[Question ID = 742][Question Description = 272_BETS1_SECTION_B_APR22_Q172]

1. Your name [Option ID = 2965]
2. Your thoughts [Option ID = 2966]
3. Your marks in all subjects [Option ID = 2967]
4. Your list of friends and their birthdays [Option ID = 2968]

123) Which one of the following lines of unix commands can tell you the number of lines in a file?

[Question ID = 743][Question Description = 273_BETS1_SECTION_B_APR22_Q173]

1. pc - f

[Option ID = 2969]

2. ls - a

[Option ID = 2970]

3. df - h

[Option ID = 2971]

4. wc - l

[Option ID = 2972]

124) Which one of the following is NOT a Data Type?

[Question ID = 744][Question Description = 274_BETS1_SECTION_B_APR22_Q174]

1. Numeric

[Option ID = 2973]

2. String

[Option ID = 2974]

3. Logical

[Option ID = 2975]

4. Thread

[Option ID = 2976]

125) Which one of the following is comparatively the best E-value to a pairwise sequence match?[Question ID = 745]

[Question Description = 275_BETS1_SECTION_B_APR22_Q175]

1. $1e-4$ [Option ID = 2977]
2. $10e-3$ [Option ID = 2978]
3. $100e-2$ [Option ID = 2979]
4. $1000e-1$ [Option ID = 2980]

126) Your friend runs a BLASTp on his unknown sequence and finds a match with E-value of 3 with a target. What does this mean?

[Question ID = 746][Question Description = 276_BETS1_SECTION_B_APR22_Q176]

1. There are e^3 sequences in the database that match the unknown sequence.

[Option ID = 2981]

2. There are 3 mismatches between the unknown and target sequences.

[Option ID = 2982]

3. The random chance of unknown sequence matching the target is 1 in 3.

[Option ID = 2983]

4. There are 3 hits of similar score that can be found by random chance.

[Option ID = 2984]

127) Where is the greatest likelihood of the occurrence of a proline residue in a protein structure?[Question ID = 747]

[Question Description = 277_BETS1_SECTION_B_APR22_Q177]

1. In the active site pocket [Option ID = 2985]
2. In the beta sheets [Option ID = 2986]
3. In the turns and loops [Option ID = 2987]
4. In the alpha helices [Option ID = 2988]

128) Where is the greatest likelihood of the occurrence of a Cysteine residue in a protein structure?[Question ID = 748]

[Question Description = 278_BETS1_SECTION_B_APR22_Q178]

1. In the active site pocket [Option ID = 2989]
2. In the beta sheets [Option ID = 2990]
3. In the turns and loops [Option ID = 2991]
4. In the alpha helices [Option ID = 2992]

129) Which family of proteins has the greatest likelihood of containing a Leucine-zipper motif?

[Question ID = 749][Question Description = 279_BETS1_SECTION_B_APR22_Q179]

1. Serine proteases

[Option ID = 2993]

2. Map kinases

[Option ID = 2994]

3. Transcription factors

[Option ID = 2995]

4. Sugar binding proteins

[Option ID = 2996]

130) Proteins usually have hydrophobic interiors or cores and hydrophilic exteriors. If a protein comprises hydrophobic patches on its outer surface, what can it mean?[Question ID = 750][Question Description = 280_BETS1_SECTION_B_APR22_Q180]

1. The protein is unstable [Option ID = 2997]
2. Structure prediction was done wrongly [Option ID = 2998]
3. It could be part of a multimeric protein complex [Option ID = 2999]
4. It is a DNA-binding protein [Option ID = 3000]

131) During analysis of Next-Gen Sequencing data, what is the advantage of BAM files over SAM files?

[Question ID = 751][Question Description = 281_BETS1_SECTION_B_APR22_Q181]

1. BAM files are human readable while SAM files are not.

[Option ID = 3001]

2. BAM files are larger than SAM files.

[Option ID = 3002]

3. BAM files are smaller than SAM files and hence easier to transfer.

[Option ID = 3003]

4. BAM files can hold more information than SAM files.

[Option ID = 3004]

132) The measure of similarity between two structurally aligned macromolecules is:

[Question ID = 752][Question Description = 282_BETS1_SECTION_B_APR22_Q182]

1. Median Distance between the Centroids (MDC)

[Option ID = 3005]

2. Root Mean Square Deviation (RMSD)

[Option ID = 3006]

3. Squared Mean Distance between atoms (SMD)

[Option ID = 3007]

4. Mean Distance between Centroids (DBC)

[Option ID = 3008]

133) Which command is suitable to list out all the directories in the working directory, in linux/unix environment?

[Question ID = 753][Question Description = 283_BETS1_SECTION_B_APR22_Q183]

1. `ls -l | grep ^d`

[Option ID = 3009]

2. `grep ^d | ls -l`

[Option ID = 3010]

3. `ls -l | grep ^d`

[Option ID = 3011]

4. `ls | grep ^dir`

[Option ID = 3012]

134) Which regions of the genome are best suited for generating DNA Barcodes for species identification?

[Question ID = 754][Question Description = 284_BETS1_SECTION_B_APR22_Q184]

1. Organellar genes

[Option ID = 3013]

2. Ribosomal genes

[Option ID = 3014]

3. Histone genes

[Option ID = 3015]

4. Non coding regions of the genome

[Option ID = 3016]

135) Which one of the following is true for PAM250 Scoring Matrix?

[Question ID = 755][Question Description = 285_BETS1_SECTION_B_APR22_Q185]

1. It is used for structural database search.

[Option ID = 3017]

2. It is based on an evolutionary model that predicts the types of amino acid changes over long periods of time.

[Option ID = 3018]

3. It can be used to score alignments for nucleotide changes over long periods of time.

[Option ID = 3019]

4. It can distinguish synonymous and non-synonymous mutations.

[Option ID = 3020]

136) Which one of the following cell separation techniques allows cells from different stages of the cell cycle to be separated simultaneously with minimal perturbation to their physiology?**[Question ID = 756][Question Description = 286_BETS1_SECTION_B_APR22_Q186]**

1. counterflow centrifugal elutriation [Option ID = 3021]

2. fluorescent activated cell sorter [Option ID = 3022]
3. size exclusion chromatography [Option ID = 3023]
4. ultracentrifugation [Option ID = 3024]

137) Choose the correct statement in respect to metazoan development:

[Question ID = 757][Question Description = 287_BETS1_SECTION_B_APR22_Q187]

1. Delta is a cell surface protein while Notch is an intracellular protein.
[Option ID = 3025]
2. Notch is a cell surface protein while Delta is an intracellular protein.
[Option ID = 3026]
3. Delta and Notch are not present on the same cell.
[Option ID = 3027]
4. Notch and Delta both are cell surface proteins present on the same precursor cell.
[Option ID = 3028]

138) The technique used in animal biotechnology for rapid multiplication and production of animals with a desired genotype is:[Question ID = 758][Question Description = 288_BETS1_SECTION_B_APR22_Q188]

1. Protoplast fusion and embryo transfer [Option ID = 3029]
2. Hybrid selection and embryo transfer [Option ID = 3030]
3. In vitro fertilization and embryo transfer [Option ID = 3031]
4. Nuclear injection of genetic material and embryo transfer [Option ID = 3032]

139) In animal cloning protocol, while performing enucleation, which chemical is used for relaxing the cellular cytoskeleton? [Question ID = 759][Question Description = 289_BETS1_SECTION_B_APR22_Q189]

1. Phytohaemagglutinin [Option ID = 3033]
2. Cytochalasin B [Option ID = 3034]
3. Pronase [Option ID = 3035]
4. Heparin [Option ID = 3036]

140) In animal cloning, donor somatic cells should be in which stage of cell cycle?[Question ID = 760][Question Description = 290_BETS1_SECTION_B_APR22_Q190]

1. G1 [Option ID = 3037]
2. S [Option ID = 3038]
3. G2 [Option ID = 3039]
4. G0 [Option ID = 3040]

141) Arrange these soluble cations (Na, Ca, K, Mg) in ascending order of abundance of soluble cations found in saline water bodies:

[Question ID = 761][Question Description = 291_BETS1_SECTION_B_APR22_Q191]

1. Na > Mg > Ca > K
[Option ID = 3041]
2. Mg > Na > Ca > K
[Option ID = 3042]
3. K > Mg > Ca > Na
[Option ID = 3043]
4. Na > Mg > K > Ca
[Option ID = 3044]

142) Which one of the following process is NOT used to convert the hydrocarbons present in the organic compounds to central metabolic intermediates?

[Question ID = 762][Question Description = 292_BETS1_SECTION_B_APR22_Q192]

1. Hydration
[Option ID = 3045]
2. Extraction
[Option ID = 3046]
3. Nitroreduction
[Option ID = 3047]
4. Reductive dehydroxylation

[Option ID = 3048]

143) In a water sample collected from an industrial cluster, the ratio of BOD:COD is found to be less than 0.3. Which one of the following may be presumed from this initial data?

[Question ID = 763][Question Description = 293_BETS1_SECTION_B_APR22_Q193]

1. There are numerous carbon-based compounds in the sample which are not utilizable by the microbial population.

[Option ID = 3049]

2. The microbial population efficiently utilizes all the organic compounds present in the sample.

[Option ID = 3050]

3. The water sample may contain carbohydrates that promote microbial growth.

[Option ID = 3051]

4. The sample contains lipids and fatty acids which require less oxygen for breakdown.

[Option ID = 3052]

144) Given below are two statements:

Statement I: Fungi are important degraders of polymers and are used in the composting and biodegradation of toxic organic substances.

Statement II: Fungi are able to selectively excrete toxins present in these polymers.

In the light of the above statements, choose the correct answer from the options given below:

[Question ID = 764][Question Description = 294_BETS1_SECTION_B_APR22_Q194]

1. Both Statement I and Statement II are true

[Option ID = 3053]

2. Both Statement I and Statement II are false

[Option ID = 3054]

3. Statement I is true but Statement II is false

[Option ID = 3055]

4. Statement I is false but Statement II is true

[Option ID = 3056]

145) Which one of the following method can be used to treat crude sewage and nitrify secondary effluent?

[Question ID = 765][Question Description = 295_BETS1_SECTION_B_APR22_Q195]

1. Duck weed ponds

[Option ID = 3057]

2. Reed beds

[Option ID = 3058]

3. Algal fish ponds

[Option ID = 3059]

4. Water hyacinth ponds

[Option ID = 3060]

146) Identify the correct statement about Fucoidans:

[Question ID = 766][Question Description = 296_BETS1_SECTION_B_APR22_Q196]

1. Fucoidans are iron containing proteins, found in blue green algae.

[Option ID = 3061]

2. Fucoidans are sulphur containing amino acids found in marine derived proteins.

[Option ID = 3062]

3. Fucoidans are iron containing lipopolysaccharides found in algal biomass.

[Option ID = 3063]

4. Fucoidans are sulfated polysaccharides, found in brown algae, that contain L-fucose among their constituent sugars.

[Option ID = 3064]

147) Due to the difficulty of isolating and culturing, many marine microorganisms are regarded as “viable but non-culturable” (VBNC). Which one of the following is a suitable method to hunt for useful genes in these organisms?

[Question ID = 767][Question Description = 297_BETS1_SECTION_B_APR22_Q197]

1. *in situ* cultivation

[Option ID = 3065]

2. growing them in a large bioreactor

[Option ID = 3066]

3. barcode sequencing

[Option ID = 3067]

4. metagenomic analysis

[Option ID = 3068]

148) Ground shark cartilage ointment is popular for its role in fast wound recovery. The active ingredient primarily responsible for this function is:[Question ID = 768][Question Description = 298_BETS1_SECTION_B_APR22_Q198]

1. N-acetylglucosamine [Option ID = 3069]

2. Hydroxyproline [Option ID = 3070]

3. Dihydroxyproline [Option ID = 3071]

4. 3,4-dihydroxyphenylalanine (DOPA) [Option ID = 3072]

149) Which one of the following is NOT extracted from seaweeds:

[Question ID = 769][Question Description = 299_BETS1_SECTION_B_APR22_Q199]

1. Agar

[Option ID = 3073]

2. Alginate

[Option ID = 3074]

3. Calcium

[Option ID = 3075]

4. Aginomoto

[Option ID = 3076]

150) Choose the correct option to fill up the blanks:

_____ nourish the host coral as well as help it deposit its skeleton. They perform _____ and pass on some of the _____ they make to the coral. [Question ID = 770][Question Description =

300_BETS1_SECTION_B_APR22_Q200]

1. hermatypic corals, scavenging, organic matter [Option ID = 3077]

2. scleractinian, respiration, calcium [Option ID = 3078]

3. ahermatypic corals, synthesis, calcium [Option ID = 3079]

4. Zooxanthellae, photosynthesis, organic matter [Option ID = 3080]