

Exam No: \_\_\_\_\_

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SARDAR PATEL UNIVERSITY

[22]

M.Sc. Integrated Biotechnology, First semester

Subject Code: PS01CIGB25

Subject Title: Biomathematics

Date:24/04/2018

Time:02:00pm to 05:00pm

Day:Tuesday

Total Marks:70

Q-1 Choose the most appropriate alternative for the following: [08]

- 99.2 hectometer = \_\_\_\_\_ mm?  
a. 9.92                      b. 0.9992                      c. 99.2                      d. 992
- Which equation represents line parallel to X- axis?  
a.  $x = 1/3 y$                       b.  $y = 10$                       c.  $x = 2x+3$                       d.  $x = 5$
- If a line is horizontal, it's slop is \_\_\_\_\_.  
a. 1                      b. 0                      c. undefined                      d. negative
- \_\_\_\_\_ is known as father of biostatistics.  
a. Francis Galton                      b. Robert Fisher                      c. Quetlet                      d. Charles Drawin
- \_\_\_\_\_ is not equivalent to 24  $\mu\text{m}$ ?  
a. 0.00024 cm                      b. 0.024 mm                      c. 24,000 nm                      d. 240,000  $\text{\AA}$
- $\log x^n =$  \_\_\_\_\_.  
a.  $\log x$                       b.  $n \log x$                       c.  $\log n x$                       d. None of these
- If  $[H^+] = 10^{-8} \text{ M}$ , then pH of the solution is  
a. 0                      b. 6                      c. 8                      d. -8
- The mode of 3,13,23,43,23 is \_\_\_\_\_.  
a. 13                      b. 3                      c. 43                      d. 23

Q-2 Attempt any seven of the following: [14]

- Write  $3.3 \times 10^{-12} \text{ M}$  scientific notation to appropriate prefixed.
- Convert  $23 \times 10^{-6} \text{ L}$  to mL.
- Write the following as a simple fraction :  $\frac{2}{y} + \frac{1}{2x}$
- Solve  $2\log 3 - 3\log 2$ .
- Find the equation of a straight line passing through the two points (1,-2) and (5,6).
- Write merits and demerits of median.
- Find mean of the given data: 312,309,310,307,309,306,300,311,308,305.
- If 20g adrenaline dissolved in 1000 mL of water, what is the concentration in M?  
[ Molar mass of adrenaline =  $183.2 \text{ g mol}^{-1}$  ]
- Define Mode for both ungrouped and grouped data.

Q-3 A Calculate  $\left[ (6.97 \times 10^3) \times (2.34 \times 10^{-6}) \right] + \left[ (5.16 \times 10^{-4}) \div (8.65 \times 10^{-8}) + (9.68 \times 10^4) \right]$  [06]

B (i) Considering formula  $a = bc + cd + f + \frac{g}{bcd}$ , if value of  $b=2, c=3, d=-3, f=1, g=-2$ , What will be the value of a? [03]

(ii) The dimensions of a rectangular cell are width =  $1 \mu\text{m}$  and length  $10 \mu\text{m}$ . Express the area in scientific notation with  $\text{m}^2$  as the units. [03]

OR

B What is the concentration in %(w/v) of a 1M solution of KCl? [06]  
[formula weight of KCl =  $74.55 \text{ g mol}^{-1}$  ]

[P.T.O.]

- Q-4 A Derive Lineweaver-Burke equation from Michaelis-Menten equation and give its plot. [06]  
 B (i) If the formula for the perimeter of a rectangle is  $P = 2l + 2w$ , rearrange the equation to make  $w$  as subject. [03]  
 (ii) If the two points on straight line are (2, 1) and (6, 3), find the slope and equation of the line. [03]

OR

- B List the application of spectroscopy in biotechnology and derive Beer Lambert law for spectrophotometer. [06]

Q-5 A Simplify  $\log 3 + 14 \log \frac{14}{15} + 12 \log \frac{25}{24} + 7 \log \frac{81}{80}$ . [06]

- B Find the value of (i)  $\log_{1/5} 345$  (ii)  $\log_{2/3} 3$  [06]

OR

- B Define pH scale. If the base has an  $\text{OH}^-$  concentration of 0.001M, then find the pH. [06]

- Q-6 A The following is a frequency distribution of the weight of 250 children. [06]

Weight in Kg	60-61	61-62	62-63	63-64	64-65	65-66	66-67
Frequency	10	25	45	55	60	40	15

Compute (i) Mean (ii) Median and (iii) Mode.

- B Calculate Karl Pearson's co-efficient of correlation between expenditure on advertising and sales from the data given below. [06]

Advertising expenses ('000Rs)	39	65	62	90	82	75	25	98	36	78
Sales (lakhs)	47	53	58	86	62	68	60	91	51	84

OR

- B The following distribution shows the days of confinement after delivery for 25 patients. [06]

Days of confinement	6	7	8	9	10
No. of patients	7	6	5	4	3

Find arithmetic mean, median, mode and standard deviation of the distribution.