[C2/63]

No. of printed pages: 3

SARDAR PATEL UNIVERSITY

M.Sc. (H.SC) I SEMESTER FBT/FN (New CBCS and ATKT)

EXTERNAL THEORY EXAMINATION

MONDAY, DATE: 03/12/12

TIME: 10.30AM TO 1.30 PM

PH01CFBT02/PH01CFDN02: BASIC BIOCHEMISTRY

Total Marks: 70

Note: 1) All the questions are compulsory.

2) Figures on the right indicate marks

3) Draw figures where ever necessary.

I. Choose the correct answer from the following **(8)**

1. After being formed by the ribosomes located on the endoplasmic reticulum, what is the next organelle to which a protein could be transported?

   a. mitochondria

   b. smooth endoplasmic reticulum

   c. Golgi apparatus

   d. nucleus

2. Which statement is NOT true about bacteria?

   a. Their cell wall is made of a slime layer that is the same as in plant cell walls.

   b. Some are motile due to flagella.

   c. They are all prokaryotes.

   d. They have a cell wall that contains peptidoglycan.

3. Which of the following step is not involved in substrate level phosphorylation ?

   a. Dihydroxyacetone phosphate Glyceraldehyde- 3-phosphate.

   b. 1,3- diphosphoglycerate 3-phosphoglycerate.

   c. Succinyl CoA Succinate.

   d. Phosphoenol pyruvate pyruvate.

4. Which of the following statements is not true of HMP shunt pathway?

   a. CO_2 is not produced in it.

   b. NADPH is produced.

   c. Pentoses are produced.

   d. Does not produce ATP.

(PTO)

(9) Order of matrix $A = \begin{bmatrix} 1 & 0 & 3 \\ 2 & 1 & 2 \end{bmatrix}$ is .....

(a) 2×2 (b) 2×3 (c) 3×2 (d) 3×3

(10) If $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ then $A^2 =$ .....

(a) $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 4 \\ 0 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$

Que.2 Attempt the following.**(any ten)** 20

(1) Evaluate $\lim_{x \to 0} \frac{\log(\sin 2x)}{\log(\sin x)}$

(2) Evaluate $\lim_{x \to 0} \frac{\log(\sin x)}{\cot x}$

(3) Evaluate $\lim_{x \to 0} \frac{x - \tan x}{x^3}$

(4) If $u = \log(x^2 + y^2)$ then prove that $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$

(5) Check whether the function $u = \sin^{-1}\left(\frac{x}{y}\right) + \tan^{-1}\left(\frac{y}{x}\right)$ is homogeneous or not?

(6) Prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ for $u = e^{ay} \cos ax$

(7) If A and B both are symmetric matrices then prove that AB is symmetric iff A and B commute.

(8) If $A = \begin{bmatrix} 2 & 1 \\ -1 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & -3 \\ -3 & 1 \end{bmatrix}$ and $C = A + B$ then find C_{21} and C_{22}.

(9) Define Column matrix and Unit matrix with example.

(10) If $A = \begin{bmatrix} 1 & 2 & 5 \\ -2 & 6 & -8 \\ 5 & 8 & 7 \end{bmatrix}$ then find $|A|$ and $|A'|$

(11) If $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ then find $A^2 - 4A + 5I$

(12) Define Characteristic matrix and Characteristic equation of matrix with example.

Que.3 [A] Find a,b and c for which $\lim_{x \to 0} \dfrac{ae^x - 2b\cos x + 3ce^{-x}}{x \sin x} = 2$ 5

[B] Evaluate $\lim_{x \to 0} \dfrac{\log(\log(1 - 3x^2))}{\log(\log(\cos 2x))}$ 5

OR

Que.3 [C] Evaluate $\lim_{x \to 0} \dfrac{e^x + \log(1 - x) - 1}{\tan x - x}$ 5

[D] Evaluate $\lim_{x \to 0} \left(\dfrac{1}{\sin^2 x} - \dfrac{1}{x^2}\right)$ 5

Que.4 [A] Find $x^2 \dfrac{\partial^2 z}{\partial x^2} + 2xy \dfrac{\partial^2 z}{\partial x \partial y} + y^2 \dfrac{\partial^2 z}{\partial y^2}$ for $z = x^n \log \frac{y}{x}$ 5

[B] If $u = \sqrt{x^2 + y^2}$ then find $\dfrac{\partial^2 u}{\partial x^2} + \dfrac{\partial^2 u}{\partial y^2}$ 5

OR

Que.4 [C] State and prove Euler's theorem for function of two variables. 5

[D] If $z = f(x, y)$, $x = r\cos\theta, y = r\sin\theta$ then prove that

$$\left[\frac{\partial z}{\partial x}\right]^2 + \left[\frac{\partial z}{\partial y}\right]^2 = \left[\frac{\partial z}{\partial r}\right]^2 + \frac{1}{r^2}\left[\frac{\partial z}{\partial \theta}\right]^2$$ 5

Que.5 [A] If $A = \begin{bmatrix} 2+i & 3-i & 4+5i \\ 1+3i & 2i & 5-6i \\ 3+i & 6-5i & 1+i \end{bmatrix}$ then find $(\overline{A})'$ and $A + A^\theta$ 5

[B] If $\begin{bmatrix} 2 & -1 & x \\ 3 & y & z \end{bmatrix} + 3\begin{bmatrix} x & y & 2 \\ 0 & -1 & 3 \end{bmatrix} = \begin{bmatrix} 5 & 8 & 7 \\ 3 & 0 & 11 \end{bmatrix}$, then find x and y. 5

OR