physics

Given: $c = 2.998 \times 10^8$ m/s; $\mu_o = 4\pi \times 10^{-7}$ M/Amp^2 ; $\varepsilon_o = 8.85 \times 10^{-12}$ F/m;
$h = 6.63 \times 10^{-34}$ J.s; $e = 1.602 \times 10^{-19}$ C; $m_e = 9.1 \times 10^{-31}$ Kg; $m_p = 1.67 \times 10^{-27}$ Kg

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e/m ratio of the electron

1. A beam of protons is moving horizontally towards you. As it approaches, it passes through a magnetic field directed downward. This magnetic field deflects the beam to your.....
2. An electron is accelerated from rest through a potential difference of 3750V. It enters a region where B=4mT perpendicular to its velocity. Calculate the radius of the path it will follow in mm?

Single and double slit

3. The interference pattern of two slits separated by a distance 0.25mm is observed on a screen at a distance 1m from the slits. The slits are illuminated by a light of wavelength 589.3nm.Calculate the separation between the adjacent bright bands in mm?
4. If the phase difference between the two waves is 4π , what is the corresponding path difference .

Plancks Constant

5. What is the work function (in eV)of the sodium metal if the photoelectric threshold wavelength is 680nm?
6. Will photoelectrons be emitted from a copper surface, of work function 4.4eV, when illuminated by visible light? Explain your answer.

Hall Effect

7. A long copper strip 1.8 cm wide and 1.00 mm thick is placed in a 1.2 T magnetic field. The magnetic field is perpendicular and into the paper. When a steady current of 15 A passes through it, the Hall emf measured is 1.02 μV. Determine drift velocity of the electrons .
8. In the above question calculate the density of the free electrons.

Ferromagnetism

9. What does the area within the hysteresis curve represent?
10. Define coercivity of material. For an electromagnet, what will be the retentivity?

Induction of solenoid

11. What is the magnetic flux through area 1.5m x 0.75m inclined 70° to a magnetic field of 1.33 T.
12. Magnetic flux per turn of a long solenoid of length l, N total no of turns and current I is given by which of the follwoing expression a)$\mu_o NIA/l$, b) $\mu_o NI/l$, c) $\mu_o N/Al$ d) $\mu_o NI/l$ where A is the area of cross section.

Electron Diffraction

13. Calculate the de Broglie wavelength in A^0 of an electron(nonrelativistic), if the speed of the electron is $10^5 ms^{-1}$.

Elastic Collision

14. Glider A of mass 60gm, moving with a velocity of 500m/s is brought to rest by the elastic collision with glider B of mass 70 gm initially at rest. Find the velocity of glider B after collision.
15. A ball of 50 g is dropped down from a height of 10 m. What is its kinetic energy just before its impact on the ground?

RLC Circuits

16. A circuit has L = 12 mH, C = 1.6 μF, and R = 1.5Ω. What is the frequency (f) at which this circuit would resonate to an external frequency?
17. In the plot of current vs frequency for series tuned circuit, it is observed that the Q factor _____ with decrease in damping resistance.

Solar Cell

18. Define photovoltaic effect

Vibrations On Strings

19. A string of length 12 m that is fixed at both ends supports a standing wave with a total of 5 nodes. What is the wavelength of this standing wave?

Fine Structure:

20. Define grating constant.

BITS, Pilani – Dubai

Dubai International Academic City, Dubai

Course Name : Measurement Technique – I (Biology) Max Mark: 40
Course Number: TA C 211 Date: 23.05.2010

2nd Semester 2009-2010

Name :	**Section Number:**
ID Number:	**Total Number of Pages : 04**

(Write the answers in the question paper itself)

1. State the function of the following microscopic components (2 marks)

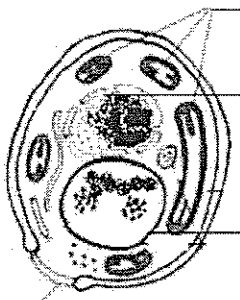
a. Rheostat –

b. Iris diaphragm lever –

c. Condenser –

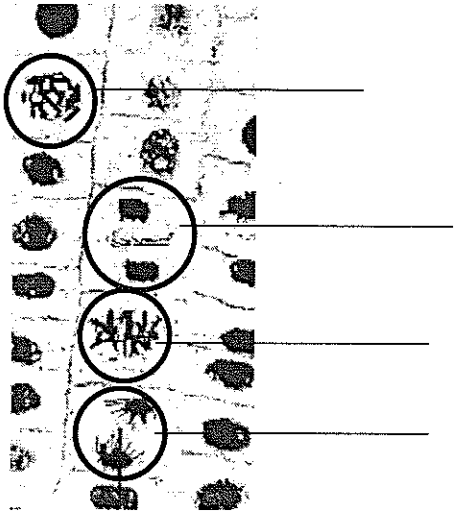
d. Immersion oil –

2. Identify label and write the biological significance (4 marks)



3. What is the duration of prophase in onion if number of prophase cells is 8 and number of mitotic cells is 30 and number of interphase cells is 167? (4 marks)

4. Label the various stages of mitosis and justify (4 marks)



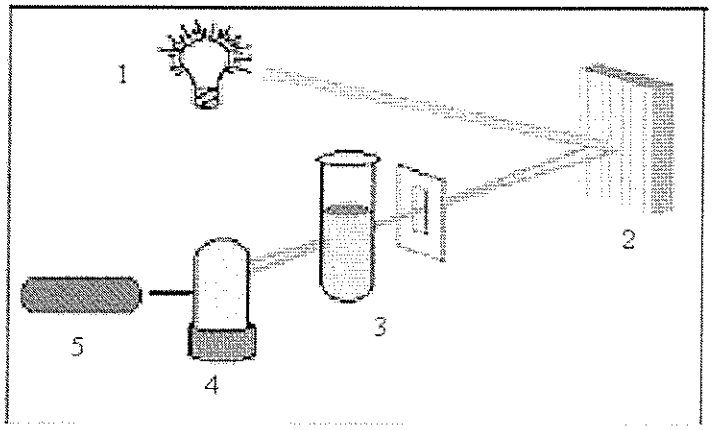
5. What does nutrient broth contain? (2 marks)

6. Write principle behind yeast cell viability count? (3 marks)

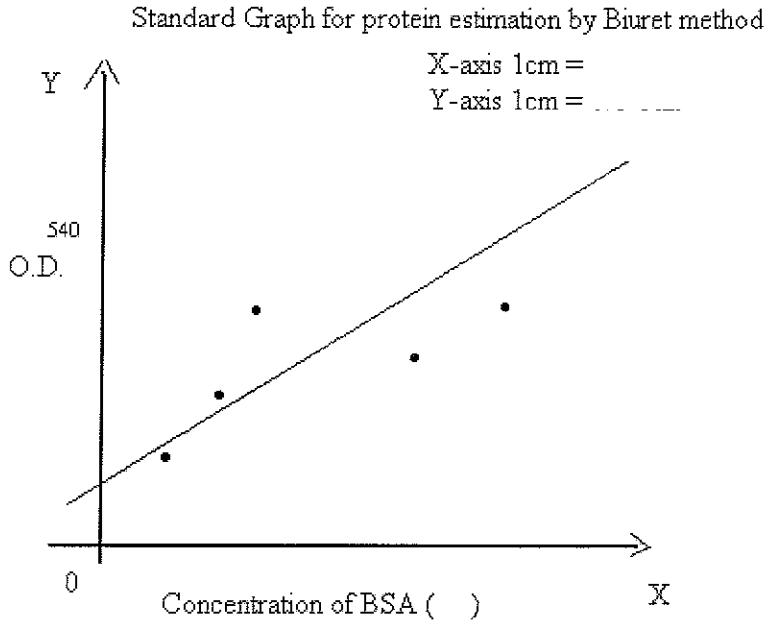
7. What is sterilization? Write any 3 types used in the preparation of culture? (4 marks)

8. How to prepare Biuret reagent? (1.5marks)

8. Name the instruments then mention the function and name of the following parts (4 marks)



10. Find the errors in the given graph. (2 marks)



11. Write the Redox reaction in Folin-Wu method. (2 marks)

12. Mention the factors that affect Beer-Lambert's law. (1.5 marks)

13. What is the use of the following (2 marks)
   a. 10% HCl in mitosis experiment
   b. PBS in viability count

14. Find out the Salinity of the water sample from the datas given below? (4 marks)

S No	Sample taken	Volume of the sample (ml)	Burette reading (ml)	
			Initial	Final
1.	Sample	5ml	0.00	0.6
			0.6	1.1
			1.6	2.2

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BITS, PILANI - DUBAI
II YEAR SECOND SEMESTER,2009-2010
COMPREHENSIVE EXAMINATION (Closed book)

Course Title: Measurement Techniques –I (Chemistry) **Max Marks: 40**
Course No: TA C211 Question paper contains 4 pages **Date: 23.5.2010**

Name :	Section No:
ID Number :	

1. What are the monosaccharide components of sucrose? **(2M)**

2. Which group in tartaric acid reduces silver ions of Tollen's reagent into metallic silver? **(2M)**

3. Which test is used to detect the presence of polyhydroxy group in carbohydrates? **(2M)**

4. What happens when oxalic acid is treated with sodium bicarbonate solution ?Give the relevant chemical equation. **(2M)**

5. Write the units of second order reaction rate constant. **(2M)**

6. Write the chemical equation for the acid catalysed hydrolysis of methyl acetate. **(2M)**

7. How will you verify graphically the rate constant of the ester hydrolysis ? **(2M)**

8. Calculate the molar conductance of the solution containing 20% dissociated acetic acid at 25 °C. The molar conductance of acetic acid at infinite dilution is 390.8 $ohm^{-1}cm^{2}mol^{-1}$ at 25 °C. **(4M)**

9. Explain why the molar conductance values of strong electrolyte is low at higher concentration, increases on dilution and reaching a limiting value. **(3M)**

10. Draw the pH titration curve for strong acid Vs strong base and indicate the stoichiometric point . **(3M)**

11. Calculate the dissociation constant of acetic acid if the pH at half way stoichiometric point is 4.76. **(3M)**

12. $KMnO_4$ is a secondary standard. Explain what you understand by this? **(2M)**

13. Potassium permanganate and Ferrous sulphate react completely in acidic medium. Products include manganous ions and Iron (III) ion. Write a balanced equation for this reaction. Also show the oxidation states of the species involved in the redox reaction, thus showing the species oxidized and species reduced. **(3M)**

14. Calculate the weight of ferrous sulphate required to prepare 0.2 M, 250 ml aqueous solution. (molar mass of ferrous sulphate = 278) **(2M)**

15. Write the equation for the acylation of aniline using acetic anhydride & acetic acid mixture? **(3M)**

16. What happens when the refluxing is continued beyond the required time? Name the compound that can form by this. **(3M)**

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