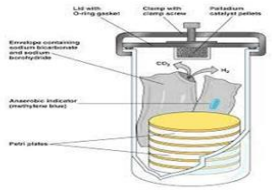
BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI – HYDERABAD CAMPUS
FIRST SEMESTER 2022-23
BIO F212 MICROBIOLOGY (ANNOUNCED QUIZ – 1) CLOSED BOOK
DATE: 29.09.22 TIME: 11:00 – 11: 30 a.m (30 MINS) MARKS: 20 MARKS.

Name of the student: ID. No.

I) Tick the most appropriate answer. Unclear markings and Overwriting will be given zero marks: (1 X 10 = 10)

1. Which of these groups includes endospore forming bacteria?
    a. *Bacillus and Clostridium*
    b. *E.coli and Staphylococcus aureus*
    c. *Treponema pallidium and Vibrio cholera*
    d. *Mycoplasma and Mycobacterium*
2. Based on the discussion and debate that you have studied on spontaneous generation identify which of the following statement is false in a retrospective viewpoint?
    a. *Fransceso Redi was an opponent of the spontaneous generation theory*
    b. *Microbes and life are created from air as claimed by Needham's through his boiled broth experiment in closed flasks which showed presence of microbes.*
    c. *Pasteur demonstrated that microbes are present in air and can contaminate solutions, but air itself does not create microbes.*
    d. *Rudolph Virchow claimed that living cells can arise only from pre-existing cells and Lavosier proved the importance of oxygen for life.*
3. Which of the following is not a contribution by the father of Microbiology – Louis Pasteur?
    a. Fermentation and Pasteurization
    b. Attenuated microbes for vaccines
    c. Disproving theory of spontaneous generation
    d. First observation of cells and live microorganisms.
4. Koch's postulates on germ theory of disease helps to determine
    a. The antibiotic producing potential of a microbe
    b. The growth of a microbe under anaerobic conditions
    c. If a specific organism was the cause of a specific disease
    d. The staining difference between gram positive and gram negative bacteria.
5. If I am using this set up to grow a microbe, what kind of organism am I most likely growing?

    a. Obligate aerobe
    b. Obligate Anaerobe
    c. Microaerophile
    d. All the three



6. Which of the following group of characteristics defines *E. coli?*
    a. Coccobacilli, sluggishly motile, gram negative, lactose fermenting
    b. Bacilli, anaerobe, lactose fermenting, multiple flagella
    c. Spirochaete, axial filaments, acid fast, endospore forming
    d. Gram positive, cocci, non-motile, pathogenic
7. Capsule staining is a method of _____ type
    a. Acid fast staining
    b. Negative staining
    c. Differential staining
    d. Special staining
8. Which of the following statement is true about plasma membranes?
    a. Plasma membrane are present in Eukaryotes but not in prokaryotes – they have cell wall.
    b. Plasma membrane of mycoplasma contain sterols but regular bacteria does not.
    c. Fimbriae are structures that you find one the inner side of plasma membrane within the cell.
    d. Plasma membrane is made up of peptidoglycan in bacteria.

9. *Staphylococcus aureus* found in nasal passages, has high tolerance for high concentrations of sodium chloride, and can also ferment carbohydrate mannitol to produce acid. If I prepare a medium Mannitol salt agar with high concentration of salt, and mannitol as a carbohydrate, what category will this medium serve as
    a. *Acts only as a selective media*
    b. *Acts only as a differential media*
    c. *Acts both as selective and differential media*
    d. *This is neither a selective nor a differential media.*
10. In an experiment measuring bacterial growth, *E. coli* cells were grown for 60 mins on glucose as a sole carbon and energy source. Subsequently, the bacteria were transferred to a different growth medium containing only lactose as the sole carbon and energy source. On transfer to this new medium, the *E.coli* cells will most likely enter which growth phase?
    a. Log phase from previous culture as the generation time of *E.coli* is around 20 mins
    b. Lag phase as needs time to adapt and induce enzymes to utilize lactose
    c. Death phase as it will have no substrate to utilize and hence rate of death will be greater with minimal reproduction
    d. Stationary phase as rate of reproduction = rate of death.

II) Name the microscopy method that is the most appropriate for the following: (0.5 X 10 = 5)

S. No	Description	Name of microscope
1.	**Detection of *Treponema pallidiium* for the diagnosis of syphilis**	
2.	**Detailed examination of internal structures of living organisms without staining**	
3.	**Rapid detection of microbes in clinical specimens using tagged antibodies**	
4.	**Uses single photon of light to illuminate one plane of specimen at a time to obtain three dimensional images**	
5.	**Produce 2D magnifications of 100000 X**	
6.	**To study surface features of cells and viruses with three dimensional impact**	
7.	**Use sound waves to examine living cells attached to another surface like artery plaques**	
8.	**Uses a thin metal probe that scans a specimen**	
9.	**Diamond probe. Uses the molecular forces of attraction and repulsion to produce three dimensional image**	
10.	**Uses immersion oil and has a resolving power of 0.3-0.4 µm.**	

III) A bacterium has a generation time of 3 hours. With how many bacteria should a culture be inoculated to obtain 81,920 bacteria after 42 hours? (5)