Indian Institute of Technology Kharagpur
Mid-Autumn Semester Examination 2014
Class: UG 2nd Year (compulsory)

Subject No: **BS20001** Subject Name: **Science of the Living Systems**
Date of Exam: f.n./a.n. Full Marks: 30 Time: 2 h

Name: _____ **Roll No.**_____ **Dept:**_____

- **Instruction to the invigilators:**
  PLEASE ENSURE THAT THE STUDENTS WRITE ANSWERS IN THE QUESTION BOOKLETS ONLY. **NO SEPARATE ANSWERSCRIPT IS NECESSARY.**
- **Instruction to students:**
  - All questions are compulsory.
  - Tick (√) the correct answer only in multiple choice questions.
  - Write the answer in the blank space (___) provided for the 'fill in the blanks'-type questions.
  - Question nos. 1 to 16 including multiple choice questions carry 0.5 mark each.
  - Question nos. 17 to 26 carry 1 mark each.
  - Question nos. 27 to 30 carry 1.5 marks each.
  - Question nos. 31 to 33 carry 2 marks each.

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1. An average width of *E coli* cell is-

a) 0.2 μm
b) 20 μm
c) 2.0 mm
d) 2.0 nm

2. The scientific name of bakers' yeast is-
a) Candida albicans
b) Penicillium notatum
c) Saccharomyces cerevisiae
d) Candida utilis

3. The microbe having no cell wall is-
a) E coli
b) Mycoplasma
c) Bacillus
d) Pseudomonas

4. The largest cell size among the following is-
a) E coli
b) Mycoplasma
c) Epulopiscium
d) Saccharomyces

5. Biconcave cell shape is for-
a) White blood cell
b) Plant cell
c) Yeast cell
d) Red blood cell

6. The functions of the endoplasmic reticulum include:
a) transportation of proteins, lipids and other materials through the cell
b) lipids and proteins synthesis
c) cell membrane synthesis
d) all of the above

7. Mitochondria is the:
a) power house of the cell
b) uses its DNA and ribosomes to synthesize some of its own proteins
c) none of the above
d) all of the above

ycle include:
growth (including chromosome duplication)
egation
e

eukaryotic cell cycle has four phases:
, G2 and M
M1, M2 and G0
1, G2, S1 and S2
S1, M1, G1 and G1

10. Nucleus is characterized by:
a) presence of nuclear pores
b) presence of one to many nucleoli
c) none of the above
d) all of the above

11. Identify the correct statement in relation to photosynthesis

a) Cyclic photophosphorylation is the process involved with photosystem I
b) A stack of thylakoids is called stroma
c) The photosystems are embedded in the stroma
d) CO_2 is liberated in the process of photosynthesis

12). Identify the correct statement in the following

a). In C4 plants the C3 cycle takes place in the mesophyll cell and C4 happens in the bundle sheath
b). In C4 plants PEP takes up CO_2 to form Pyruvate
c). In photorespiration O_2 does not compete with CO_2 for binding to RUBISCO
d). PEP is a CO_2 fixing enzyme

13. Conversion of $FADH_2$ releases _____ molecules of ATP

14. Name the enzyme responsible for conversion of Pyruvate to Acetyl Co-A:

_____.

15. Write the overall reaction for respiration

16. Name the enzyme responsible for lactic acid fermentation:

17. Name the major mitochondrial metabolic event that generates energy for cel

18. What is the function of ribosome?

19. Name one important role of vacuole:

20. Lysosomes are synthesized by _____ and _____

21. The three major components of the apoptotic pathway are _____

22. What is the definition of photorespiration?

23. Electron transport chain consists of _____ complexes, and from _____ electrons are transferred to oxygen.

24. In the first step of glycolysis, glucose is phosporylated by _____ to form _____

25. For each Glucose molecule, the Krebs Cycle produces _____ NADH, _____ $FADH_2$, _____ ATP and _____ CO_2.

26. When O_2 reacts with Ribulose 1, 5-bisphosphate_____ and _____ are formed.

27. What is the largest known cell and its approx. diameter?

28. State the characteristics of apoptotic cells

29. Schematically represent the steps which lead to formation of ethanol from glucose.

30. Write three differences between C3 and C4 plants

31. Show with a diagram the association of lipid and protein in biomembrane.

32. Draw a portion of mitochondrial membrane, and show the distribution of various complexes of ETC.

33. Give a schematic representation of the Z scheme of photosynthesis and name the parts