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FOR KUET EXAM PREPARATION

KUET 2021 Question Paper · M.Sc. Microbiology

EXAM	YEAR	TYPE	SUBJECT
KUET	2021	Question Paper	M.Sc. Microbiology

Sr. No. .....

ENTRANCE TEST-2021

SCHOOL OF BIOLOGICAL SCIENCES

MICROBIOLOGY

Question Booklet Series **A**

Total Questions : 60
Time Allowed : 70 Minutes

Roll No. : | | | | | | |

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/ herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

1. Classification of viruses by David Baltimore is based on differences in :
   (A) The envelope proteins on the surface of viruses
   (B) The modes of transmission of viruses
   (C) The pathways required to synthesize virus mRNA
   (D) Host cell receptors used by viruses
2. The typical coronavirus structure is :
   (A) An icosahedral large pleomorphic virus
   (B) Large regimented barrel shaped virus
   (C) Club shaped glycoprotein spikes protrude through a lipid bilayer
   (D) An icosahedral structure with an envelope
3. Target of the antibiotics on micro organisms is mainly due to :
   (A) Inhibition of cell-wall synthesis
   (B) Damage to the cytoplasmic membrane
   (C) Inhibition of nucleic acid and protein synthesis
   (D) All of the above
4. Which of the following is an unusual feature of the replication cycle in coronaviruses ?
   (A) The RNAs all terminate in a common 3′ end and produce nested set with the genome.
   (B) They take advantage of recombination with the long RNA genome
   (C) They are not highly mutable
   (D) They use capped cellular mRNA's
5. Identify the gene responsible for the evolutionary relationship between the taxonomic groups :
   (A) 16S rRNA
   (B) 23S rRNA
   (C) 5S rRNA
   (D) 18S rRNA
6. Select the pleomorphic bacteria
   (A) Mycobacteria
   (B) Corynebacterium
   (C) Streptococcus
   (D) Pseudomonas
7. Growth requirement for mycoplasma :
   (A) Nitrogen
   (B) Carbon
   (C) Cholesterol
   (D) Glucose
8. Double-stranded DNA is found in which viruses ?
   (A) Poliomyelitis
   (B) Influenza viruses
   (C) Pox viruses
   (D) None of the above
9. Which of the following is a parasitic algae ?
   (A) Sargassus
   (B) Cladophora
   (C) Oedogonium
   (D) Celphaleuros

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10. Laminarin is an energy storage material characteristic of :

(A) Chlorophyta

(B) Chrysophyta

(C) Phaeophyta

(D) Pyrrophyta

11. Mark the incorrect statement concerning *Giardia lamblia* :

(A) *G. Lamblia* has both a trophozoite and cyst stage in its life cycle

(B) *G. Lamblia* is transmitted by the fecal oral route from both human and animal sources

(C) *G. Lamblia* causes hemolytic anemia

(D) *G. Lamblia* can be diagnosed by the string test

12. Identify the organ associated for defence in protozoans :

(A) Statocysts

(B) Trichocysts

(C) Otocysts

(D) Nematocysts

13. Secondary metabolites such as penicillin from mold are produced during the :

(A) Lag phase

(B) Idiophase

(C) Log phase

(D) Decline phase

14. Clearances of antigens by antibodies involve :

(A) Neutralization and agglutination

(B) Opsonisation and complement activation

(C) Precipitation

(D) All of the above

15. Hypervariable region of antibody consists of :

(A) 5-10 amino acids that form antigen binding site

(B) 50-100 amino acids that form antigen binding site

(C) 5-10 amino acids that form antibody binding site

(D) A part of constant region of heavy and light chain

16. Which of the following factor affects the heat of reaction based on Kirchhoff equation ?

(A) Molecularity

(B) Temperature

(C) Pressure

(D) Volume

17. Chemical dissociation is :

(A) Exothermic

(B) Reversible

(C) Endothermic

(D) Reversible and endothermic

18. The principle laws of photochemistry are :

(A) Grothus-Draper and Stark-Einstein law

(B) Raoult's and Dalton's law

(C) Raoult's and Henry's law

(D) Lambert's and Beer's law

19. Which of the following will result in deviation from Beer's law ?

i. Change in a refractive index of medium

ii. Dissociation of analyte on dilution

iii. Polychromatic light

iv. Path length of cuvette.

(A) i, ii and iii

(B) ii, iii and iv

(C) i, iii and iv

(D) i, ii and iv

20. Mark the incorrect statement :

(A) First step in photochemistry is excited state (photo excitation)

(B) When a molecule or atom in the ground state (S_0) absorbs light, one electron is excited to a higher orbital level

(C) It is possible for the excited state S_1 to undergo spin inversion

(D) Photochemical reactions are caused by absorption of ultraviolet only

21. Which of the following processes are thermodynamically reversible ?

(A) Throttling

(B) Constant volume and constant pressure

(C) Hyperbolic and $pV = C$

(D) Isothermal and adiabatic

22. Mark the enzyme necessary for the below mentioned biochemical reaction : Triglyceride + $3H_2O \longrightarrow$ Glycerol + Fatty acids

(A) Lipase

(B) Zymase

(C) Glycerol phosphate dehydrogenase

(D) Glycerol kinase

23. Identify the physical property differ for each of a pair of enantiomers ?

(A) Boiling point and melting point

(B) Index of refraction

(C) Solubility in ethanol

(D) Direction of rotation of plane-polarized light

24. Which of the following statements about an enzyme is incorrect ?

(A) An enzyme is usually a large protein

(B) An enzyme changes the equilibrium constant of a reaction

(C) An enzyme is a catalyst for biological reactions

(D) An enzyme is a chiral molecule

25. Catalase is found exclusively in :

(A) Lysosomes

(B) Peroxisomes

(C) Golgi apparatus

(D) Mitochondria

26. Substrate level phosphorylation in glycolysis is :

(A) Conversion of Glucose to Glucose-6-phosphate

(B) Conversion of Glyceraldehyde-3-phosphate to 1, 3-Bisphosphoglycerate

(C) Conversion of Dihydroxyacetone phosphate to Glyceraldehyde-3-Phosphate

(D) Conversion of 1, 3-Bisphosphoglycerase to 3-Phosphoglycerate

27. Identify the organelle involved in apoptosis :

(A) Lysosome

(B) Mitochondria

(C) ER

(D) Golgi

28. The origin of polytene chromosome (as giant chromosome) is by the process of :

(A) Endomixes

(B) Endomitosis and endoreduplication

(C) Mitosis

(D) Meiosis

29. Major role of carbohydrates as a component of the cell membrane is :

(A) Adhesion

(B) Locomotion

(C) Recognition

(D) Reception

30. mtDNA is considered as one of the best marker tool for population biologist and evolutionary biologist. The reason for this :

(A) Mitochondrial DNA undergo spontaneous mutation

(B) Mitochondrial DNA can be easily isolated

(C) Mitochondrial genes are specified to mtDNA

(D) Absence of genetic recombination in mtDNA

31. Which one of the following properties of telomerase is different from that of DNA polymerase ?

(A) Telomerase requires a template to direct the addition of nucleotides

(B) Telomerase can only extend a 3 -OH end of DNA

(C) Telomerase does not carry out lagging strand synthesis

(D) Telomerase acts in a processive manner

32. During development, if a cell has committed to a particular fate, it is said to be :

(A) Pluripotent

(B) Totipotent

(C) Determined

(D) Differentiated

33. Which of the following statements is incorrect about topoisomerases as a potential anticancer drug target ?

(A) As cancer cells are rapidly growing cells, they usually contain higher level of topoisomerases.

(B) The transient DNA breaks created by topoisomerases are usually converted to permanent breaks in the genome in the presence of topoisomerase targeted drugs.

(C) As cancer cells often have impaired DNA repair pathways, they are more susceptible towards topoisomerase targeted drugs.

(D) The drugs which specifically target topoisomerases, usually to do not affect normal fast growing cells.

34. Nitric oxide synthase is responsible for generation of nitric oxide, an important signaling molecule. The substrate for this enzyme is :

(A) Glycine

(B) Lysine

(C) Histidine

(D) Arginine

35. Which one of the following is not a neurotransmitter ?

(A) Adrenaline

(B) Histidine

(C) Glutamate

(D) Histamine

36. Identify the vector using in human genome project :

(A) Cosmid vectors

(B) Yeast artificial chromosomes

(C) Phagemid vector

(D) Yeast episomal plasmids

37. Which one of the following fungi is the most serious threat in a bone marrow transplant unit ?

(A) Candida albicans

(B) Aspergillus

(C) Blastomyces

(D) Cryptococus

38. Enzymes responsible for alcoholic fermentation :

(A) Zymase

(B) Ketolase

(C) Peroxidase

(D) Oxidase

39. Monoclonal antibodies are associated with the name of :

(A) Burnet

(B) Medwar

(C) Milstein kohler

(D) Owen

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40. The ability of a pathogen to spread in the host tissues after establishing the infection is known as :

(A) Adhesion

(B) Invasiveness

(C) Toxigenicity

(D) None of these

41. Which of the following enzyme is defective in galactosemia — a fatal genetic disorder in infants ?

(A) Glucokinase

(B) Galactokinase

(C) Galactose-1-phosphate uridyl transferase

(D) UPD-Galactose 4-epimerase

42. Gluconeogenesis occurs in the liver because of the presence of :

(A) Phosphofructokinase

(B) Pyruvate carboxylase

(C) Glucose 6 phosphatase

(D) Glucokinase

43. Emergence of unique functional heavy chain-only antibodies in which of the following animals ?

(A) Dog

(B) Camel

(C) Pigeon

(D) Mice

44. Which one of the following is the correct order of electron transport during light reaction in the thylakoid membrane of chloroplast ?

(A) P680 ® Cytochrome b_6f ® PC ® PQ

(B) P680 ® PC ® Cytochrome b_6f ® PQ

(C) P680 ® PQ ® PC ® Cytochrome b_6f

(D) P680 ® PQ ® Cytochrome b_6f ® PC

45. The C_4 carbon cycle is a CO_2 concentrating mechanism evolved to reduce photorespiration. The following are stated as important features of the C_4 pathway :

i. The leaves of C_4 plants have Kranz anatomy that distinguishes mesophyll and bundle sheath cells.

ii. In the peripheral mesophyll cells, atmospheric CO_2 is fixed by phosphoenol pyruvate carboxylase yielding a four-carbon acid.

iii. In the inner layer of mesophyll, NAD-malic enzyme decarboxylates four-carbon acid and releases CO_2.

iv. CO_2 is again re-fixed through Calvin cycle in the bundle sheath cells.

Which one of the following combinations is correct ?

(A) i, iii and iv

(B) i, ii and iii

(C) i, ii and iv

(D) i, iii and iv

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46. Given below are names of phytohormones in column I and their associated features/effects/ functions in column II :

	I		II
(a)	Auxin	(i)	Delayed leaf senescence
(b)	Gibberellins	(ii)	Epinastic bending of leaves
(c)	Cytokinin	(iii)	Polar transport
(d)	Ethylene	(iv)	Removal of seed dormancy

Select the correct set of combinations from the options given below :

	(a)	(b)	(c)	(d)
(A)	(iii)	(ii)	(iv)	(i)
(B)	(iv)	(iii)	(i)	(ii)
(C)	(iii)	(iv)	(i)	(ii)
(D)	(i)	(iv)	(iii)	(ii)

47. Which one of the following is used for Targeting Induced Local Lesions in Genomes (TILLING) ?

(A) T-DNA tagging by Agrobacterium-mediated transformation

(B) Transposon tagging using Ac/Ds elements

(C) Mutagenesis with ethylmethane sulphonate

(D) Protoplast transportation by electroporation

48. Lake zone having phytoplanktons in abundance :

(A) Littoral zone

(B) Benthic zone

(C) Limnetic zone

(D) Profundal zone

49. Identify the food chain type :

Dead animals → blowfly maggot → maggots → frog → snake

(A) Detrital food chain

(B) Decomposer food chain

(C) Predator food chain

(D) Grazing food chain

50. Point out the 'K' selected species :

(A) Aspergillus

(B) Human

(C) Taraxacum

(D) Grass

51. The middle region of thermal stratification, showing the vertical temperature change is called :

(A) Mesolimnion

(B) Epilimnion

(C) Metalimnion

(D) Hypolimnion

52. The purpose of Lincoln index is to measure :

(A) Population mortality rate

(B) Population natality rate

(C) Population size

(D) Population density

53. The workers of cement factory are prone to :

(A) Leukemia

(B) Bone marrow diseases

(C) Asbestosis

(D) Cytosilicosis

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54. The Yak (ox) and the Bharal are found in :

(A) Uttarakhand

(B) Himachal Pradesh

(C) Jammu and Kashmir

(D) Ladakh

55. Which of the following statements is true about the Air Quality Index ?

(A) It indicates the colour of the air.

(B) It predicts ozone levels in your area.

(C) It determines the intensity of sound and sound pollution.

(D) It estimates air pollution mainly sulphur content in the air.

56. Algal productivity in fresh water lakes is limited by the availability of inorganic ions of :

(A) Carbon

(B) Nitrogen

(C) Phosphorus

(D) All of the above

57. Select the wrong statement regarding correlation :

(A) In case of positive correlation, the two variables move in the same direction

(B) In case of negative correlation, the two variables move in different directions

(C) The value of coefficient of correlation (r) vary in between –1 to +1

(D) The calculated r value "0.075" indicates strong positive correlation

58. The result of a statistical test, denoted p, shall be interpreted as follows :

(A) The null hypothesis h_0 is rejected if $p < 0.05$

(B) The null hypothesis h_0 is rejected if $p > 0.05$

(C) The alternate hypothesis h_1 is rejected if $p > 0.05$

(D) The null hypothesis h_0 is accepted if $p < 0.05$

59. The value of Chi-square will be zero when :

(A) Expected frequency is less than the observed frequency

(B) Expected frequency is equal to the observed frequency

(C) Expected frequency is double that of the observed frequency

(D) Expected frequency is greater than the observed frequency

60. Identify the statistical test to validate the statement "people having high cholesterol suffer from hypertension".

(A) Student's t-test

(B) Regression analysis

(C) Pearson correlation coefficient test

(D) ANOVA

ROUGH WORK

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