

Roll No. ....

Question Booklet Number

O. M. R. Serial No.

--	--	--	--	--	--	--	--

**M. Sc. (Biochemistry) (Fourth Semester)**  
**EXAMINATION, July, 2022**  
**(Elective)**

**INDUSTRIAL BIOCHEMISTRY**

**Paper Code**

BCH	4	0	0	3	(A)
-----	---	---	---	---	-----

Questions Booklet  
Series

**C**

Time : 1:30 Hours ]

[ Maximum Marks : 100

**Instructions to the Examinee :**

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 questions will be considered for evaluation. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

**परीक्षार्थियों के लिए निर्देश :**

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page)

(शेष निर्देश अन्तिम पृष्ठ पर)

***(Only for Rough Work)***

1. Large vessel containing all the parts and condition necessary for the growth of desired microorganisms is called :
  - (A) Bio-reactor
  - (B) Auto reactor
  - (C) Impeller
  - (D) None of the above
2. For thorough mixing of medium and inoculum the part of fermenter useful is :
  - (A) Shaft
  - (B) Headspace
  - (C) Impeller
  - (D) Sparger
3. In fermenter the top portion left without broth is called :
  - (A) Shaft
  - (B) Head space
  - (C) Impeller
  - (D) Sparger
4. Overheating of fermenter during fermentation is controlled by :
  - (A) Cooling jacket
  - (B) Steam
  - (C) Cool air
  - (D) None of the above
5. Antifoam agent is :
  - (A) Silicon compound
  - (B) Corn oil
  - (C) Soybean oil
  - (D) All of the above
6. The capacity of laboratory fermenters is :
  - (A) 12–15 litre
  - (B) 2000 gallons
  - (C) 500 litres
  - (D) 10000 gallons
7. Different methods of strain improvement are :
  - (A) Protoplast fusion
  - (B) Recombinant DNA technique
  - (C) Genetic recombination
  - (D) All of the above

8. The purification and recovery of the production after fermentation is called :
  - (A) Upstream process
  - (B) Downstream process
  - (C) Surface fermentation
  - (D) None of the above
9. Submerged fermentations are :
  - (A) Batch fermentation
  - (B) Continuous fermentation
  - (C) Both (A) and (B)
  - (D) None of the above
10. If more than one microorganism is used to obtain the required product, that type of fermentation is called :
  - (A) Batch
  - (B) Continuous
  - (C) Dual
  - (D) Fed-batch
11. Methods used to get immobilized enzymes :
  - (A) Adsorption
  - (B) Encapsulation
  - (C) Covalent bonding
  - (D) All of the above
12. Pectinase is industrially produced from :
  - (A) *S. cerevisiae*
  - (B) *Trichoderma koningii*
  - (C) *A. niger*
  - (D) None of the above
13. Cellulose are produced from :
  - (A) *S. cerevisiae*
  - (B) *Trichoderma koningii*
  - (C) *A. niger*
  - (D) None of the above
14. The penicillin produced in large scale submerged fermentations is :
  - (A) Penicillin-A
  - (B) Penicillin-D
  - (C) Penicillin-G
  - (D) None of the above
15. Which one of the following is not a monosaccharide sugar :
  - (A) glucose
  - (B) sucrose
  - (C) fructose
  - (D) galactose

16. Which one of the following provides the greatest energy value per gram of nutrient :
- (A) carbohydrate
  - (B) fat
  - (C) protein
  - (D) water
17. When starch is cooked in moist conditions it may :
- (A) caramelize
  - (B) coagulate
  - (C) gelatinize
  - (D) oxidise
18. Which one of the following does not contains fat ?
- (A) Meant
  - (B) Cheese
  - (C) Butter
  - (D) Sugar
19. Proteins are made up of :
- (A) amino acids
  - (B) monosaccharides and disaccharides
  - (C) glycerol units
  - (D) vitamins and minerals
20. Which one of the following cooking processes does not rely on coagulation taking place :
- (A) frying chips
  - (B) making yoghurt
  - (C) whipping cream
  - (D) boiling an egg
21. Which one of the following vitamins dissolves in water ?
- (A) D
  - (B) retinol
  - (C) thiamin
  - (D) K
22. Which of the following foods is not a good source of iron ?
- (A) meat
  - (B) eggs
  - (C) milk
  - (D) liver
23. Which one of the following minerals is often added to the water supply in order to help reduce tooth decay ?
- (A) iodine
  - (B) fluorine
  - (C) chlorine
  - (D) potassium

24. Myoglobin, when combined with oxygen, as in freshly-cut piece of red meat, will be :
- (A) pink
  - (B) brown
  - (C) bright red
  - (D) dark red
25. Which of the following is likely to deteriorate in quality the quickest if not frozen or preserved in some other way ?
- (A) chicken
  - (B) kidney
  - (C) pork
  - (D) herring
26. Which of the following describes the process by which fat droplets are dispersed in milk to prevent a cream layer forming ?
- (A) homogenization
  - (B) hydrogenation
  - (C) pasteurization
  - (D) holder process
27. Which of the following has a minimum fat content of 55 percent ?
- (A) whipped cream
  - (B) single cream
  - (C) double cream
  - (D) clotted cream
28. Which of the following types of cheese is characterized by mould growth on the surface ?
- (A) Brie
  - (B) Gruyere
  - (C) Stilton
  - (D) Cheddar
29. Which of the following does not involve micro-organisms as an essential part of its production ?
- (A) butter
  - (B) margarine
  - (C) yoghurt
  - (D) camembert
30. A suitable temperature for the storage of most vegetables is :
- (A) 0°C
  - (B) 5°C
  - (C) 15°C
  - (D) 20°C

31. Which of the following microorganisms produces dextran ?
- (A) *Bacillus polymyxa*
  - (B) *Bacillus thuringiensis*
  - (C) *Leuconostoc mesenteroides*
  - (D) *Streptomyces olivaceus*
32. What is the sequence in which organic compounds are used by the body during prolonged fasting ?
- (A) Carbohydrates first, proteins and then lipids
  - (B) Carbohydrates first, lipids and then proteins
  - (C) Proteins first, lipids and then carbohydrates
  - (D) Fats first, carbohydrates and then proteins
33. Which of the following carbohydrates are mainly present in whey ?
- (A) Glucose
  - (B) Lactose
  - (C) Fructose
  - (D) Sucrose
34. Which vitamin is most likely to be lost from stewing beef if it is boiled for a long time ?
- (A) Vitamin A
  - (B) Nicotinic acid
  - (C) Vitamin C
  - (D) Vitamin D
35. Which of the following raw materials are important for the production of glutamic acid ?
- (A) Glycerol
  - (B) Corn-steep liquor
  - (C) Tryptone
  - (D) Biotin
36. Which of the following yeast is used for the production of riboflavin ?
- (A) *Saccharomyces cerevisiae*
  - (B) *Eremothecium ashbyi*
  - (C) *Saccharomyces rouxii*
  - (D) *Candida utilis*
37. Which of the following products utilize whey as its raw material ?
- (A) Lactic acid
  - (B) Acetic acid
  - (C) Glutamic acid
  - (D) Lysine
38. First genetically engineered and biotechnologically produced vaccine was against :
- (A) Small pox
  - (B) AIDS
  - (C) Herpes simplex
  - (D) Hepatitis B

39. The best medium for the production of Penicillin is :
- (A) Nutrient agar
  - (B) Corn steep liquor
  - (C) Sulfite waste liquor
  - (D) Whey
40. Industrially important Antibiotic producing organisms shall be isolated by :
- (A) Disk plate method
  - (B) Direct plate method
  - (C) Serial dilution method
  - (D) Crowded plate method
41. Industrial alcohol will be produced by using starter culture :
- (A) Top yeast
  - (B) Middle yeast
  - (C) Bottom yeast
  - (D) Feeder yeast
42. Pyruvate decarboxylase acetaldehyde +  $\text{CO}_2$  = This reaction is specially observed in :
- (A) Lactic acid fermenters
  - (B) Ethanol fermenters
  - (C) Algae
  - (D) Plants
43. The pyruvate, dehydrogenase  $\rightarrow$  multienzyme complex does not occur in :
- (A) Aerobic bacteria
  - (B) Microphilic bacteria
  - (C) Facultative anaerobic bacteria
  - (D) Strictly anaerobic bacteria
44. A major ingredient of penicillin production media is :
- (A) Corn meal
  - (B) Corn steep liquor
  - (C) Cane steep liquor
  - (D) None of the above
45. The outstanding example of traditional microbial fermentation product is :
- (A) Vinegar
  - (B) Penicillin
  - (C) Citric acid
  - (D) Tetracyclin



46. Which of the following involves the formation of nitrate from ammonia :
- (A) Ammonification
  - (B) Denitrification
  - (C) Nitrification
  - (D) Nitrogen fixation
47. One of the standard cloning vectors widely used in gene cloning is :
- (A) Ti plasmid
  - (B) EMBL 3
  - (C) pBR 322
  - (D) EMBL 4
48. In alcoholic fermentation,  $\text{CO}_2$  is evolved during :
- (A) Decarboxylation of pyruvic acid
  - (B) Formation of acetaldehyde
  - (C) Oxidation of acetaldehyde
  - (D) Both (A) and (B)
49. In the industrial production of streptomycin, the secondary metabolite or byproducts is :
- (A) Vitamin  $\text{B}_{12}$
  - (B) Vitamin C
  - (C) Vitamin  $\text{B}_6$
  - (D) Ethanol
50. Tobacco and tea leaves are fermented to give flavor and taste. This type of fermentation is known as :
- (A) Alcohol fermentation
  - (B) Curing
  - (C) Degradation
  - (D) Lactic acid fermentation
51. Vinegar fermentation involves :
- (A) Yeasts only
  - (B) Yeasts with lactic bacteria
  - (C) Yeasts with acetic acid bacteria
  - (D) Yeasts with butyric acid bacteria
52. By-product of acetone-butanol fermentation include :
- (A) Riboflavin
  - (B) Penicillin
  - (C) Isopropanol
  - (D) All of the above
53. Transgenic animals are for improvement of the quality of :
- (A) Milk
  - (B) Meat
  - (C) Eggs
  - (D) All of the above

54. Thermal resistant bacteria are important in the preservation of foods by :
- (A) Freezing
  - (B) Canning
  - (C) Chemicals
  - (D) Irradiation
55. The fungus used in the industrial production of citric acid :
- (A) *Rhizopus oryzae*
  - (B) *Fusarium moniliforme*
  - (C) *Rhizopus nigricans*
  - (D) *Aspergillus nigricans*
56. Penicillin is commercially produced by :
- (A) *P. notatum*
  - (B) *P. chrysogenum*
  - (C) *P. citrinum*
  - (D) *P. roqueforti*
57. Batch fermentation is also called :
- (A) Closed system
  - (B) Open system
  - (C) Fed-Batch system
  - (D) Sub-merger system
58. To differentiate lactose and non-lactose fermenters, the medium used is :
- (A) MacConkey's medium
  - (B) Stuart's medium
  - (C) Sugar medium
  - (D) Citrate medium
59. Streptokinase is also termed as :
- (A) Fibrinolysin
  - (B) Catalase
  - (C) Coagulase
  - (D) Hyaluronidase
60. Streptokinase is produced by :
- (A) *Staphylococcus aureus*
  - (B) *Streptococcus pneumoniae*
  - (C) *Str. faecalis*
  - (D) *Str. pyogenes*

***(Only for Rough Work)***

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

**Example :**

**Question :**

Q. 1 (A) ☒ (B) (C) (D)

Q. 2 (A) (B) ☒ (C) (D)

Q. 3 (A) ☒ (B) (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

**Impt. :** On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर—A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छोटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ☒ (B) (C) (D)

प्रश्न 2 (A) (B) ☒ (C) (D)

प्रश्न 3 (A) ☒ (B) (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

**महत्वपूर्ण :** प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।