


Name:			
Enrolment No:			
<b>UNIVERSITY OF PETROLEUM AND ENERGY STUDIES</b> <b>End Semester Examination, May 2022</b>			
<b>Course: Biochemical Process Engineering</b> <b>Program: B.Sc. Microbiology</b> <b>Course Code: HSCC2027</b>		<b>Semester: IV</b> <b>Time : 03 hrs.</b> <b>Max. Marks: 100</b>	
<b>Instructions: Answer all the questions</b>			
Q.No	Section A Answer all the questions	(20Q x1.5M= 30 Marks)	COs
Q	Statement of question <b>Short answer questions/ MCQ/True &amp;False</b>		CO
1.	Which of the following is true a) Nutrient bath is basal medium b) Addition of selective substances in a solid medium is called enrichment media c) Agar has nutrient properties d) Chocolate medium is selective medium	1.5	CO1
2.	The solidifying agent used in microbiology laboratories to solidify medium  a) Cellulose b) Peptone c) Thioglycollate d) agar	1.5	CO1
3.	Blood agar medium is  a) Enrichment medium b) Enriched medium c) Selective medium d) Differential medium	1.5	CO1
4.	Peptone water and nutrient broth are  a) Enriched media b) Enrichment media c) Basal media d) Differential media	1.5	CO1
5.	The most commonly used solidifying agent agar is obtained from  a) Brown algae b) Red algae c) Green algae d) Blue-green algae	1.5	CO1

6.	The three parameters of steam sterilization are a) Steam under pressure b) Time, temperature, concentration c) Temperature, time, humidity	1.5	CO2
7.	The sterilizer heat sensing thermometer s located in the a) Chamber b) Drain line c) jacket	1.5	CO2
8.	Flash sterilization may be necessary when, a) Loaner instruments are received late b) A one of a kind of instrument is dropped c) Instrument inventory is low	1.5	CO2
9.	For sterilization to occur, steam must: a) Make direct contact with all surface b) Be superheated c) Be flushed into each package d) Trap air inside the package	1.5	CO2
10.	Preconditioning of the sterilizer load is done by a) Running the sterilizer for 1 min, and then restarting the load b) Placing the load in sterilizer and closing the door for 15 min. c) Letting the load come to room temperature and then starting the cycle	1.5	CO2
11.	Aerobic reactions are not batch operations a) True b) False	1.5	CO3
12.	In a perfectly mixed reactor_____ a) The output composition is different from input composition b) The output composition is identical from input composition c) Both output and input compositions are constant d) Both output and input compositions are not constant	1.5	CO3
13.	Which of the following type is of the perfusion culture a) Batch b) Conc. Batch c) Continuous d) Fed-batch	1.5	CO3
14.	The combination of ideal rector's among the following is____ a) Plug flow reactor and batch reactor b) Batch reactor and mixed flow reactor c) Plug flow reactor and mixed flow reactor	1.5	CO3

	d) Batch reactor only		
15.	Which type of reactor, aeration is generally accomplished in a separate vessel  a) Fluidized bed b) Trickle bed c) Packed bed d) Stirred and air-driven reactors	1.5	CO4
16.	What is the unit of influent flow rate?  a) md b) m/d c) m <sup>2</sup> /d d) m <sup>3</sup> /d	1.5	CO4
17.	The reverse of Hydraulic retention time is the _____  a) Sedimentation rate b) Dilution rate c) Filtration rate d) Chemical rate	1.5	CO4
18.	Centrifugation is based on the principle of when a force is less than the gravity desired  a) True b) False	1.5	CO5
19.	Which of the following is not a type of centrifugation  a) Hydro cyclone b) Tubular centrifuge c) Micro-filtration d) Disk stack separator	1.5	CO5
20.	By increasing the feed rate of liquid in tubular centrifuge the performance is increased  a) True b) False	1.5	CO5
	<b>Section B</b> Answer all the questions	<b>(4Qx5M=20 Marks)</b>	CO
Q	Statement of question <b>Short answer questions. Word limit 100 to 120</b>		
1.	Describe about media preparation	5	CO1

2.	Define sterilization and describe the concept of sterilization	5	CO2
3.	Discuss about Fed batch reactor with neat diagram	5	CO3
4.	Discuss about environmental conditions effect growth kinetics	5	CO1
<b>Section C</b> Answer all the questions		<b>(2Qx15M=30 Marks)</b>	
Q	Statement of question <b>Long answer questions. Word limit 250 to 300</b>		CO
1.	Describe the phenomenon of Fluidized bed reactor with neat diagrams	15	CO4
2.	Assume that experimental measurements for a certain organism have shown that cells can convert two-thirds (wt/wt) of the substrate carbon (alkane or glucose) to biomass a. Calculate the stoichiometric coefficients for the following biological reactions: Hexadecane: $C_{16}H_{34} + aO_2 + bNH_3 \rightarrow c(C_{4.4}H_{7.3}N_{0.86}O_{12}) + dH_2O + eCO_2$ Glucose: $C_6H_{12}O_6 + aO_2 + bNH_3 \rightarrow c(C_{4.4}H_{7.3}N_{0.86}O_{12}) + dH_2O + eCO_2$ b. Calculate the yield coefficients $Y_{x/s}$ (g dw cell/g substrate), $Y_{x/O_2}$ (g dw cell/ g $O_2$ ) for both reactions.	8+7	CO2
<b>Section D</b> Answer all the questions		<b>(2Qx10M=20 Marks)</b>	
Q	Statement of question <b>Long answer questions. Word limit 200 to 250</b>		CO
1.	With a neat diagram explain Batch Reactor with respect to bioprocess engineering	10	CO3
2.	Describe Filtration that is used for recovery of particulates	10	CO5