

Section J: Biotechnology

Q. 1 - Q. 10 carry one murk each.

Q.1	Cells of meristemoid are best described as						
	(A) differentiated and non dividing (C) differentiated and dividing		(B) dedifferentiated and dividing (D) dedifferentiated and non dividing				
Q.2	Ultrafiltration pro	cess can not be used for	ne .				
	(A) fractionation	of proteins	(B) desalting				
	(C) harvesting of		(D) selective removal of solvents				
Q.3	The number of replicons in a typical mammalian cell is						
	(A) 40-200	(B) 400	(C) 1000-2009	(D) 50000-100000			
Q.4	What product will result from complete hydrolysis of soluble dextran?						
	(A) Sucrose only		(B) Fructose only				
	(C) Glucose and fructose only		(D) Glucose only				
Q.5	Aeration in a biorector is provided by						
	(A) impeller	(B) baffles	(C) sparger	(D) all of the above			
Q.6	The transplastomic plants bear no risk for gene transfer through pollens as						
	(A) the pollens degenerate before fertilization (B) the transformed mitochondrial DNA is lost during pollen maturation (C) the transformed chloroplast DNA is lost during pollen maturation (D) the transformed genomic DNA are inherited maternally						
Q.7	The mobility of DNA in agarose gel electrophoresis is solely based on its						
	(A) charge		(B) conformation				
	(C) size		(D) none of the above				
Q.8	Which of the following fluorescent probes is used to monitor the progress-of amplification in Real time PCR?						
	(A) SYBR green	(B) Rhodamine *	(C) FITC	(D) Cyan blue			
Q.9	Expression of which of the following reporter genes does not require addition of specific substrate for detection?						
	(A) Luciterase.		(B) β-Glucuronida				
	(C) B-Glucosidase		(1)) Green fluoresc	ent protein			
•							

Q.10	Cibacron Blue dye affinity chromatography can be used for affinity purification of							
	(A) NADPH dehydrogenase	(B) glucoamylase						
	(C) subtilisin	(D) caspase						
		(b) cuspuse						
	Q. 11 - Q. 2	26 carry two marks each						
Q.11	A linear DNA fragment is 100% labeled at one end and has 3 instriction sites for							
	FcoRI. If it is partially digested by EcoRI so that all possible fragments are produce							
	how many of these fragments will be labeled and how many will not be labeled?							
			<u> </u>					
	(A) 4 labeled; 6 unlabeled	(B) 4 labeled; 4 unlabeled						
	(C) 3 labeled: 5 unlabeled	(D) 3 labeled; 3 unlabeled						
0.12	Market	A CONTRACTOR OF THE CONTRACTOR						
Q.12	Match the f. llowing products with their starting substrates							
	a) Sake	1) apple juice						
	b) cider	2) grape juice						
	c) wine	3) barley						
	d) lager	4) rice						
	(A) $a \to 4$, $b \to 1$, $c \to 2$, $d \to 3$	(B), $a \rightarrow 1$, $b \rightarrow 4$, $c \rightarrow 2$, $d \rightarrow 3^{-1}$						
	(C) $a\rightarrow 2$, $b\rightarrow 3$, $c\rightarrow 1$, $d\rightarrow 4$	(D) $a\rightarrow 3$, $b\rightarrow 4$, $c\rightarrow 2$, $d\rightarrow 1$						
Q.13	Identify the following antibiotics	with their modes of sating						
2.500.00	Antibiotic							
50	a) Ampicillin	Mode of action 1) inhibition of protein synth						
	b) Tetracycline							
	THE STATE OF THE PROPERTY OF T							
	d) Anthramycin	 damage to cytoplasmic m damage to DNA structure 	cilitianc					
	(A) $a \rightarrow 1$, $b \rightarrow 2$, $c \rightarrow 4$, $d \rightarrow 3$	(B) a→2, b→1, c→3, d→4						
	(C) $a \rightarrow 1$, $b \rightarrow 2$, $c \rightarrow 3$, $d \rightarrow 4$	(D) $a \rightarrow 3$, $b \rightarrow 4$, $c \rightarrow 2$, $d \rightarrow 1$						
	(9/4 //: 0 72, 0 75, 0 74	(D) $a \rightarrow 3$, $0 \rightarrow 4$, $c \rightarrow 2$, $d \rightarrow 1$	N.					
2.14	In a bioreactor baffles are incorporated to							
	(A) prevent was							
	(A) prevent vortex and to improve seration efficiency							
	(B) maintain uniform suspension of cells							
	(C) minimize the size of air bubble for greater aeration (D) maintain uniform nutrient medium							
.15	Somatic embryo from cotyledon explant would develop in the following sequential							
	stages.							
		F						
((A) cotyledonary → heart → globu	ılar→ torpedo -						
	(b) globular→ torpedg→ heart → cotyledonary							
	(C) globular → heart → torpedo → cotyledonary							
	(D) cotyledonary-+ globular-→ heart → torpedo							
717	*							
V								
1								
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- 16 Though the right border (RB) and left border (LB) of T-DNA are identical, the DNA transfer is specific for the DNA left of the RB (the T-DNA), rather than for the DNA left of the LB because
 - (A) the sequence context at the RB defines the direction of transfer
 - (B) the sequence context at the LB defines the direction of transfer
 - (C) the nuclear location sequence (NLS) of VirD2 protein drives the excised T-strand
 - (D) the endonuclease activity of VirD2 protein allows nicking at RB
- 0.17 Determine the correctness or otherwise of the following Assertion [a] and Reason [r] Assertion: An antigen recognized by one immunoglobulin subtype is not recognized by any other subty pe.

Reason: Immunoglobulin subtypes differ from each other both in the variable and in the constant regions.

- (A) Both [a] and [r] are true and [r] is the correct reason for [a]
- (B) Both [a] and [r] are true but [r] is not the correct reason for [a]
- (C) Both [a] and [r] are false
- (D) [a] is true but [r] is faise
- Q.18 Identical sized RNA transcript is detected by Northern blot analysis of UDP glucuronosyl transferase obtained from human liver and kidney. Microarray analysis of the same samples shows equal spot intensity, whereas Western blot detects a 55kDa strong band in liver, but a very faint band in kidney of same size. The regulation of UDP glucuronosyl transferase is
 - (A) transcriptionally controlled
 - (B) post-transcriptionally controlled
 - (C) translationally controlled
 - (D) post-translationally controlled
- Q 19 Match the items on the left column with those on the right

Left

P. Programmed cell death at site of infection I. TMV coat protein

Q. Hormone upregulated during flooding stress

R. Target for herbicide glyphosate

S. Pathogen-derived resistance

Right 2. EPSP synthase

3. Hyper-sensitive response

4. Ethylene

(A) P-1, Q-2, R-4, S-3

(C) P-1, Q-4, P-2 C 3

(B) P-3, Q-4, R-2, S-1 (D) P-3, Q-2, R-4, S-1

Q.20 Using the Hill equation for an enzyme [S] = (vo Kar/ Vmax - vo) 1/2 and the plot of logio (vo/ V max - vo) vs logio [S], one can find out

- (P) V_{max} from the intercept on the ordinate
- (Q) Km from the intercept on the ordinate
- (R) 'n' from the slope
- (S) Kon from the intercept on the abscissa



(B) Q, R

(C) R, S

(D) P, S



(P) the absence of capping mechanism of mRNA (Q) codon bias (R) absence of polyadenylation (S) absence of proper glycosylation (A) P, Q (B) Q, R (C) Q, S (D) P, S Common Data Questions Common Data for Questions 22, 23, 24: A recombinant SV40 virus delivers e-myc cDNA, which has a unique Sal I site, into muscle cells. Southern analysis of Sal I digested total genomic DNA of the muscle cells using c-myc cDNA probe generates a smear. Q.22 The DNA smear obtained on Southern blot is due to (A) head to head concatamer of viral DNA (B) head to tail concatamer of viral DNA (C) tail to tail concatamer of viral DNA (D) random integration of viral DNA (D) random integration of viral DNA (C) upto 10 generations (D) more than 100 generations (D) more than 100 generations Q.24 Which of the following types of cancer will be observed in such transformed cells? (A) Adenoma (B) Melanoma (C) Sarcoma (D) Hepatoma Common Data for Questions 25, 26: Normal primary hypatocytes can be artificially immortalized. Certain spontaneous mutants of immortalized hepatocytes are sensitive to ionizing radiation. Q.25 Which of the following genes are involved in Immortalization of primary hepatocytes? (A) Telomerase and Cyclin D (B) NFKB and Thymidine kinase (C) Cyclin D and myc (D) Telomerase and Ras Q.26 What would happen to the mutant cells by ionizing radiation? (A) Apoptosis (B) Necrosis (C) Cell growth arrest (D) Cell proliferation	Q.21	Expression in poor amount and in inactive form of cDNA of a eukaryotic protein in Excherichia coli using its expression vector is due to							
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	Q.26	What would happen to the mutant cells by ionizing radiation?							
		713.7		20.00					
(C) Cell growth arrest (D) Cell proliferation									
	V_	(C) Cell growth ar	rest	(D) Cell prolifer	ation				
	7 4								

Linked Answer Questions: Q27a to Q28b carry two marks each

Statement for Linked Answer Questions 27a & 27b

An aliquot of competent E. coli cells were used for determination of cell density by place count method and another aliquot was used for transformation by plasmid DNA.

- Q.27a E. coli,cell culture (1ml) was diluted 1:1000000 and 200µl of this was used for plating. After 12h incubation of the plate, the number of colony forming units (CFU) was 150. What is the total CFU per ml in the original culture?
 - (A) 7.5×108
- (B) 1.5×10⁴
- (C) 1.5 ×10°
- (D) 3.0×10°
- Q.27b Isolated plusmid DNA (Sng) was used for transformation of 100µl competent E. colicells to which 900µl of SOC medium was added. An aliquot of 50µl was plated on a selective plate. After overnight incubation, 300 colonies were observed. Calculate the efficiency of transformation and the percentage of transformed calls per mi of parent culture.



- (A) 6.0×10⁵ colonies per µg of plasmid DNA, 0.01%
- (B) 1.2×10⁵ colonies per μg of plasmid DNA, 0.02%
- (C) 1.2×106 colonies per µg of plasmid DNA, 0.008%
- (D) 60×106 colonies per µg of plasmid DNA, 0.1%

Statement for Linked Answer Questions 28a & 28b.

HMGCoA reductase that binds HMGCoA, is the major rate limiting step in the cholesterol biosynthetic pathway. Several inhibitors of this enzyme are used as potential drugs. The assay of the enzyme is based on labeling the enzyme with adiolabeled HMGCoA and counting (cpm) the labeled enzyme-substrate complex in the presence (test) and in the absence (control) of the inhibitor. A blank is set up that contains no enzyme.

- Q.23a The per cent inhibition for this enzyme is calculated from the equation
 - (A) {[cpm (control) cpm (test)]/ [cpm (control) cpm (blank)]} x 100
 - (B) {[cpm (control) cpm (test)]/ { cpm (blank) cpm (control)]} x 160
 - (C) {[cpm (test) cpm (control)]/ [cpm (control) cpm (blank)]} x 100
 - (D) [[cpm (control) cpm (blank)]/[cpm (test) cpm (control)]] x 100
- Q.28b An inhibitor is considered active if it causes more than 65% inhibition. The cpm values respectively of control, test and blank samples for inhibitors W, X, Y and Z are given below. State willight of the inhibitors is active.
 - (A) X 8000, 4000 and 100
- (B) W 7000, 1400 and 135
- (C) Y 7500, 5000 and 90
- (D) Z 7200, 2800 and 200

