

# TEST SERIES CSIR-NET/JRF JUNE 2019

## BOOKLET SERIES **A**

Paper Code **03**

Test Type: **TEST SERIES**

### LIFE SCIENCES

Duration: 2:00 Hours

Date: 17-05-2019

Maximum Marks: 170

Read the following instructions carefully:

\* Single Paper Test is divided into **THREE** Parts.

**Part - A:** This part shall carry **10** questions. Each question shall be of **2** marks.

**Part - B:** This part shall carry **25** questions. Each question shall be of **2** marks.

**Part - C:** This part shall contain **25** questions. Each question shall be of **4** marks.

\* Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.

\* There will be negative marking @25% for each wrong answer.

\* The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

\* For rough work, blank sheet is attached at the end of test booklet.



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## PART-A

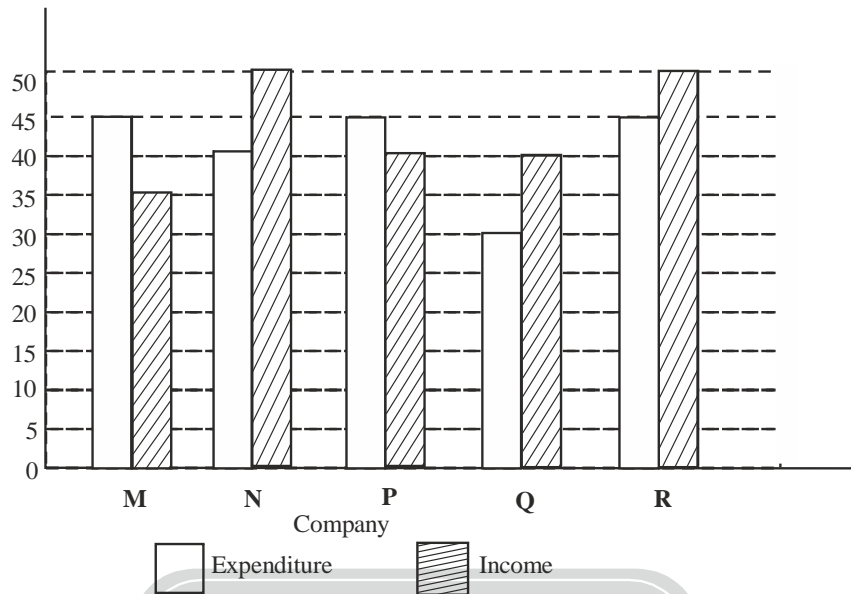
1. A and B working separately can do a piece of work in 9 and 12 days respectively. If they work for a day alternately, A beginning, in how many days, the work will be completed ?
- (a)  $5\frac{1}{4}$  days      (b)  $10\frac{1}{4}$  days      (c)  $15\frac{1}{4}$  days      (d)  $8\frac{1}{4}$  days
2. Robert is travelling on his cycle and has calculated to reach point A at 2 P.M. if he travels at 10 kmph; he will reach there at 12 noon if he travels at 15 kmph. At what speed must he travel to reach A at 1 P.M. ?
- (a) 8 kmph      (b) 11 kmph      (c) 12 kmph      (d) 14 kmph
3. If in a certain language 'CARD' is coded as 'EYUA' and 'BABY' is coded as 'DYEV', then in the same language what will be the code for 'CODE' ?
- (a) ERGB      (b) ERAB      (c) EMGB      (d) EMGH
4. In a dinner party A, B, C, D, E, F and G are to be seated in a row facing north
1. F is to the immediate right of E.
  2. E is 4<sup>th</sup> to the right to G.
  3. C sits between B and D.
  4. Person who is third to left of D is at one end.
- Who sits second to the left of C ?
- (a) G      (b) E      (c) F      (d) B
5. Water flows into a tank  $200\text{ m} \times 150\text{ m}$  through a rectangular pipe  $1.5\text{ m} \times 1.25\text{ m}$  at the rate of 20 kmph. In what time (in minutes) will the water rise by 2 metre ?
- (a) 80 min.      (b) 90 min.      (c) 96 min.      (d) 100 min.
6. What shall come next in the series ?
- |   |    |    |    |   |
|---|----|----|----|---|
| 5 | 11 | 24 | 51 | ? |
|---|----|----|----|---|
- (a) 92      (b) 110      (c) 74      (d) 106
7. Mr. Nemai is the maternal grandfather of Mr. Shankar's wife's daughter. How is Mr. Nemai's son related to the daughter of Mr. Shankar ?
- (a) Brother      (b) Maternal uncle      (c) Nephew      (d) Cousin
8. Two cards are drawn together from a pack of well shuffled deck of cards. What is the probability that one is spade and one is diamond ?
- (a)  $1/26$       (b)  $1/52$       (c)  $2/102$       (d)  $13/102$
9. Sourav's mathematics test had total 75 questions, partly 10 arithmetic, 30 algebra and 35 geometry questions. Although he answered 70 % of the arithmetic, 40 % of the algebra and 60 % of the geometry questions correctly, he couldn't pass the test because he got less than 60 % of the questions right. How many more questions he would have needed to answer correctly to get 60 % passing grade ?
- (a) 8      (b) 6      (c) 4      (d) 5
10. The following bar-graph shows the Income and Expenditures (in million US \$) of five Companies in the year 2011. The percent profit or loss of a Company is given by

$$(\text{Profit/Loss})\% = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

Study the graph and answer the questions that are based on it.



Income and Expenditure (in million US \$) of five Companies in the year 2011



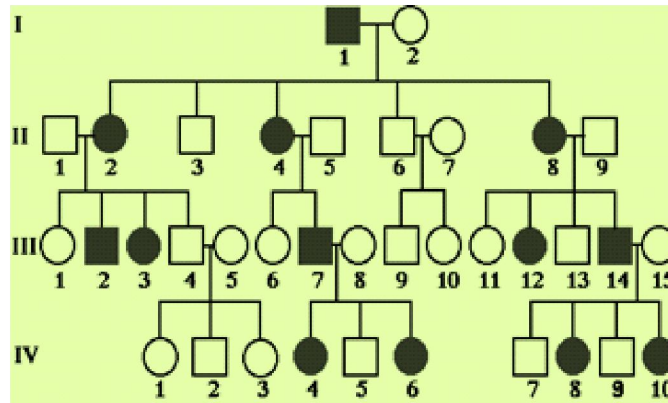
In 2011 what was the approximate percentage of profit/loss of all the five Companies taken together?  
 (a) 5 % profit      (b) 6.5 % profit      (c) 4 % loss      (d) 7 % loss

### PART-B

11. A plant with genotype  $AABbCc$  is self-fertilizing. The number of different types genotypes and phenotypes in next generation would be:  
 (a) 9 and 4      (b) 4 and 6      (c) 4 and 4      (d) 6 and 4
12. In a cross between two black Labrador retrievers, the phenotypic ratio of the offspring is 9 black puppies to 3 chocolate puppies to 4 yellow puppies. This is an example of  
 (a) partial recessiveness      (b) incomplete penetrance  
 (c) incomplete dominance      (d) epistasis
13. In *Limnaea*, a  $Dd$  dextrally coiled snail was crossed with a  $Dd$  sinistrally coiled snail. The dextral snail contributed egg while sinistral snail contributed sperms. The outcome would be:  
 (a) All sinistral      (b) Half dextral and half sinistral  
 (c) Dextral and sinistral in ratio of 3:1      (d) All dextral
14. In a cross between wild type  $Hfr$  strain and  $F^-$  cell auxotrophic for  $trp$ ,  $thr$ ,  $mal$ ,  $ile$  and  $leu$ ;  $trp^+$  is the first marker to enter the recipient. Out of the recombinants obtained, 81% are  $leu^+$ , 17% are  $mal^+$ , 23% are  $ile^+$  and 2% are  $thr^+$ . The order of markers is:  
 (a)  $trp$ ,  $thr$ ,  $mal$ ,  $ile$  and  $leu$       (b)  $trp$ ,  $leu$ ,  $ile$ ,  $mal$  and  $thr$   
 (c)  $trp$ ,  $mal$ ,  $ile$ ,  $thr$  and  $leu$       (d)  $trp$ ,  $leu$ ,  $mal$ ,  $ile$  and  $thr$



15. The pattern of inheritance shown in given pedigree is:



- (a) Autosomal dominant (b) Autosomal recessive  
(c) X-linked dominant (d) X-linked recessive
16. Lactose operon in bacteria is inducible by presence of lactose in the medium. Which of the following is TRUE for the *E. coli* grown in medium containing both glucose and lactose?
- (a) No expression of  $\beta$ -galactosidase enzyme  
(b) Low expression of  $\beta$ -galactosidase enzyme  
(c) Maximum expression of  $\beta$ -galactosidase enzyme  
(d) Presence of glucose does not influence the  $\beta$ -galactosidase expression.
17. In humans, a hereditary disorder called xeroderma pigmentosum (XP) can result in the inability to repair ultraviolet damage to DNA. Which of the following molecular lesions is most likely to accrue in individuals with XP?
- (a) Thymine dimers (b) Deamination of cytosine  
(c) Depurination (d) Single strand DNA breaks
18. Which of the following most accurately describes a retrotransposon?
- (a) A DNA sequence that can move from one site in the genome to another without replicating  
(b) A DNA sequence that can be deleted from the genome without consequence  
(c) A DNA sequence that replicates via an RNA intermediate  
(d) A DNA sequence that replicates via a protein intermediate
19. A DNA strand with the sequence 5'-CGA TTG-3' would be complementary to the sequence
- (a) 5'-GCU AAC-3' (b) 5'-GCT AAC-3'  
(c) 5'-GTT AGC-3' (d) 5'-CAA TCG-3'
20. Which of the following best explains how mutations in DNA can result in the expression of a new phenotype?
- (a) A different polypeptide is produced.  
(b) The polarity of tRNA becomes the opposite of that of DNA.  
(c) Nucleic acids are methylated.  
(d) The gene is now read in the 3' to 5' direction.
21. Which of the following is associated with the promoter clearance by RNA polymerase-II during transcription?
- (a) TFIID binding with TATA element  
(b) Phosphorylation of the  $\alpha$ CTD of RNA pol II  
(c) TBP dissociation from TATA element  
(d) Dissociation of mediator complex from RNA polymerase-II

22. The peptidyl transferase enzyme catalyze peptide bond formation during the translation elongation. In eukaryotes this is due to
- 18S rRNA in large subunit of ribosome
  - Ribosomal protein factors in large subunit of ribosomes
  - 23S rRNA in large subunit of ribosomes
  - 28S rRNA in large subunit of ribosomes
23. Which among the following is the low affinity receptor for IL-2?
- IL-2R  $\alpha$
  - IL-2R  $\gamma$
  - IL-2R  $\beta\gamma$
  - IL-2R  $\beta$
24. Signaling pathway in response to interferons and other cytokines involves JAK-STAT pathways. Correct combination of JAK-STAT for IFN- $\gamma$  signalling is
- JAK 1 and 3 / STAT-1
  - JAK 1 and 3 / STAT-6
  - JAK 1 and 2 / STAT-1
  - JAK 1 / STAT-3
25. Formation of C<sub>3</sub> convertase is a major amplification step during complement activation. Which among the following is C<sub>3</sub> convertase for classical pathway?
- $\overline{C4b2a3b}$
  - $\overline{C3bBb}$
  - $\overline{C3bBbC3b}$
  - $\overline{C4b2a}$
26. <sup>51</sup>Cr release assay is used for
- Assessment of cytokine secretion by T<sub>H</sub>-cells
  - Release of perforin and granzyme B by B-cells
  - Cytotoxic activity of CD8 T-cells
  - Phagocytic activity of neutrophils
27. A set of 3 leukotrienes that collectively induced smooth muscle contraction is called as slow reacting substance of anaphylaxis or SRS-A. One of the following is NOT a part of it.
- LTB<sub>4</sub>
  - LTC<sub>4</sub>
  - LTD<sub>4</sub>
  - LTE<sub>4</sub>
28. Cromolyn sodium is a drug that is used to treat type I hypersensitivity. It acts by
- Blocking H<sub>1</sub> and H<sub>2</sub> receptors on target cells
  - Blocking Ca<sup>2+</sup> influx into mast cells and preventing degranulation
  - Blocking the conversion of histidine to histamine
  - Stimulating cAMP production for long duration
29. For a X-linked recessive trait which of the given statements are true?
- Mostly males are sufferer of disease
  - Male child from affected mother are carrier
  - Affected daughter from a affected mother
  - Affected daughter from a affected father
30. Maternal inheritance of coiling of shell in snail (*Limnaea peregra*) is well established. The dextral coiling depends on dominant allele D and sinistral coiling depends upon recessive allele d. A female F1 progeny of dextral (Dd) type is crossed with a male sinistral snail. What will be the ratio of dextral : Sinistral in F2 progeny?
- 3 : 1
  - 1 : 1
  - 1 : 0
  - 1 : 2 : 1
31. Consider two genes A and B are on the same chromosome, but near to the distal ends of the chromosome. A researcher performed cross between AB and ab individuals. What is the possible maximum recombinant that can be observed in the progenies?
- 0%
  - 25%
  - 50%
  - 100%



32. The most suitable method for detection of anti-HIV antibodies in the serum of a patient is:
- (a) Immunoprecipitation (b) Competitive ELISA  
(c) RIA (d) Indirect ELISA
33. Hybridoma technology is used for generation of monoclonal antibodies. Which of the following statements is NOT true about this technology?
- (a) The myeloma cells used are defective for both HGPRT and antibody production  
(b) The aminopterin in the HAT medium inhibits de-novo DNA synthesis.  
(c) The antibody producing B-cell partner in hybridoma are defective in de-novo DNA synthesis.  
(d) Hypoxanthine and thymidine act as precursors for DNA synthesis.
34. Inositol triphosphate ( $IP_3$ ) and diacylglycerol (DAG) are formed when phospholipase-C cleaves :
- (a) Phosphatidylinositol - 3, 4 bisphosphate.  
(b) Phosphatidylinositol - 4, 5 bisphosphate  
(c) Phosphatidylinositol- 1,5 bisphosphate  
(d) Phosphatidylinositol - 2, 3 bisphosphate
35. Why do some signals (first messengers) trigger second messengers to activate target cells.
- (a) The first messenger requires activation by ATP  
(b) The first messenger binds to many types of cells  
(c) There are no receptors for the first messenger  
(d) The first messenger cannot cross the plasma membrane

### PART-C

36. In an experiment involving Mendelian traits of seed shape and color, a cross between wrinkled yellow and round yellow plants the progeny obtained was in ratio
- 6/16 wrinkled, yellow  
2/16 wrinkled, green  
6/16 round, yellow  
2/16 round, green
- The genotypes of parents should be:
- (a)  $WwGG \times WwGg$  (b)  $wwGg \times WwGg$   
(c)  $WwGg \times WwGg$  (d)  $WwGg \times wwgg$
37. In foxes the coat color may be platinum or silver. A cross between silver foxes always yields silver foxes. On the other hand, a cross between platinum foxes gives platinum and silver foxes in a ratio of 2:1.
- The foxes can never be true breeding for platinum coat.
  - The platinum foxes are always heterozygous.
  - Platinum coat shows dominance over silver coat allele.
  - True breeding silver foxes are lethal.
  - Platinum color allele is dominant for both color and lethality
  - Platinum color allele is recessive for lethality and dominant for coat color.
- Which of the following combinations has two correct and two incorrect statements?
- (a) 1, 2, 3 and 4 (b) 1, 4, 5 and 6  
(c) 1, 2, 5 and 6 (d) 1, 2, 3 and 5

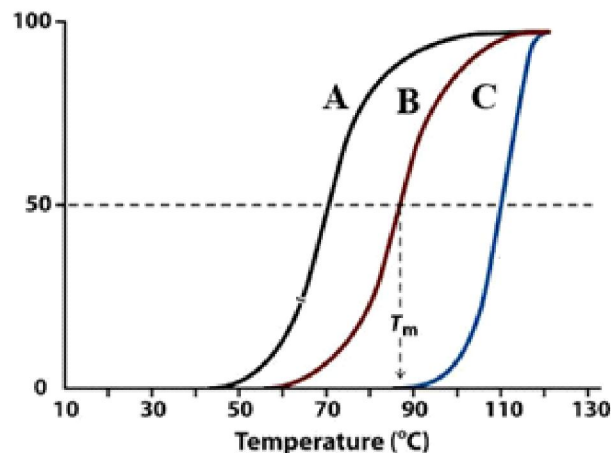


38. Which of the following statements about mitochondrial genome is not correct?
- Plant mitochondrial genome is much larger than human mitochondrial genome
  - Human mitochondrial DNA encodes 2 rRNA, 30tRNA and 13 polypeptides
  - Two strands of mitochondrial DNA differ in density, one is heavy (H) and other light (L)
  - Many of proteins required for mitochondrial structure and function are coded by nuclear genes.
39. Three somatic hybrid cell lines, designated 11, 23, and 45, have each been scored for the presence, or absence, of human chromosomes 1 through 8, as well as for their ability to produce the hypothetical human gene products P, Q, R, and S.

Hybrid cell line	Human chromosome present								Gene products expressed			
	1	2	3	4	5	6	7	8	P	Q	R	S
11	+	+	+	+	-	-	-	-	-	+	-	+
23	+	+	-	-	+	+	-	-	+	-	-	+
45	+	-	+	-	+	-	+	-	+	+	-	+

Which of the following statements are true:?

- Gene P is present on chromosome 1
  - Gene Q is present on chromosome 5
  - Gene R cannot be assigned to any of chromosomes
  - Gene S is present on chromosome 8
40. Tay-Sachs disease (TSD) is an inborn error of metabolism that results in death, often by the age of 2. You are a genetic counselor interviewing a phenotypically normal couple who tell you the male had a female first cousin (on his father's side) who died from TSD and the female had a maternal uncle with TSD. There are no other known cases in either of the families, and none of the matings have been between related individuals. Assume that this trait is very rare. The probability that one of them is a carrier and the other is not:
- 1/12
  - 6/12
  - 5/12
  - 3/12
41. Given is the melting profile of DNA isolated from three different species, A, B and C respectively



Based on the graphs following interpretations were made for the genomes of the three species.

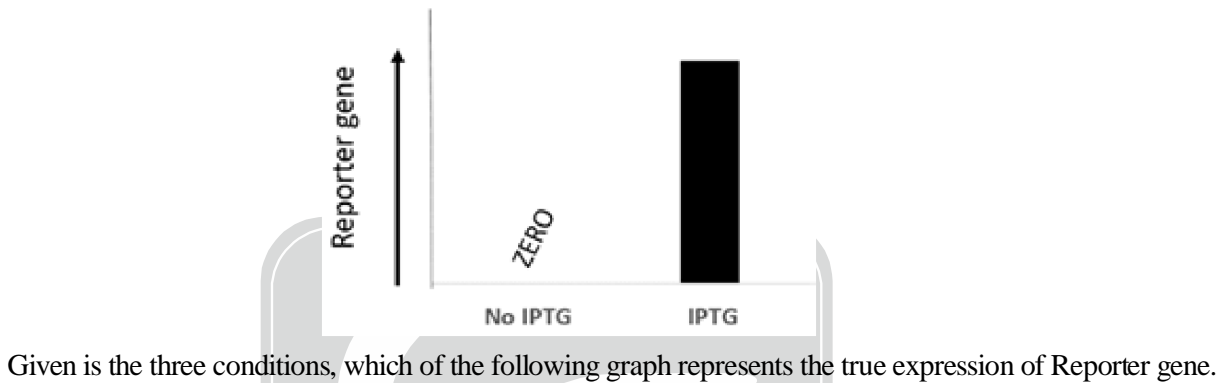


- A) The genome C has more of the A:T content as compare to B and C  
 B) The decreasing order of the GC content in the genomes is  $C > B > A$ .  
 C) All the three genome has equal value of  $T_m$  value  
 D) The genome of A will melt first when heated together in-vitro.

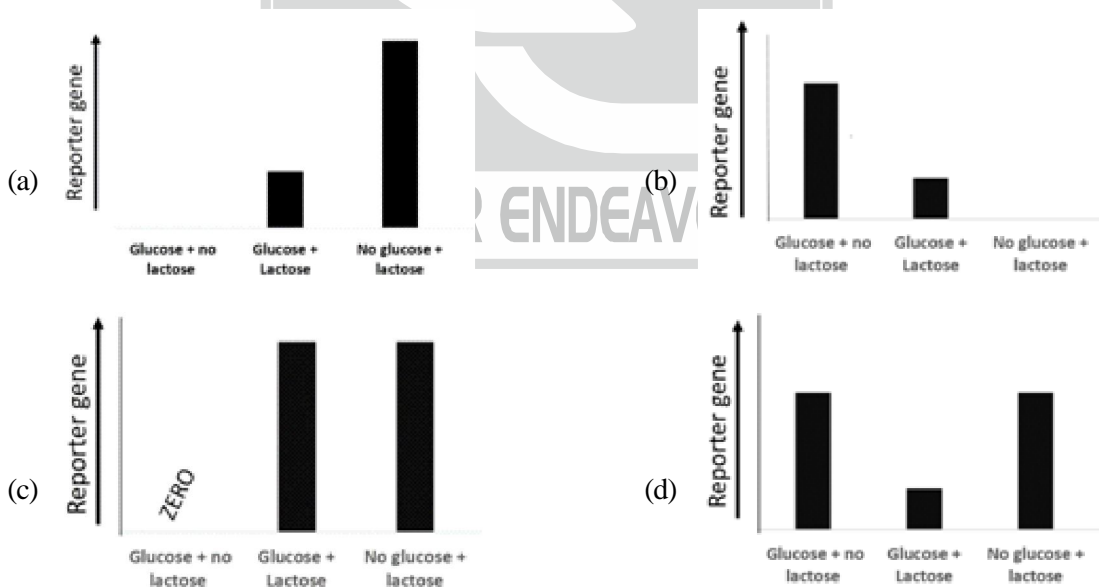
Which of the above statements are true?

- (a) A, D                      (b) B, C                      (c) C, D                      (d) B, D

42. A construct was generated in which a reporter gene was cloned downstream to a lactose operon system. IPTG, a compound is used to induce protein expression where the gene is under the control of the lac operator. Given is the expression of reporter gene in presence or absence of IPTG molecules.



- O. Glucose + no lactose  
 P. Glucose + Lactose  
 Q. No glucose + lactose



43. RNA interference a mechanism of RNA mediated gene silencing in Eukaryotes. It has two pathways miRNA and siRNA. Despite the similar mechanism the processing and mechanism of inhibition are different for miRNA from siRNA.
- P. miRNA is exogenous in origin and siRNA is encoded by the genome.  
 Q. Processing of miRNA requires DRISHA in the cytoplasm.  
 R. Both the miRNA and siRNA is cleaved by DICER to produce 21-24 nucleotide small RNA molecule.  
 S. siRNA has multiple target mRNA and miRNA has single target mRNA.





Which of the above statements are TRUE?

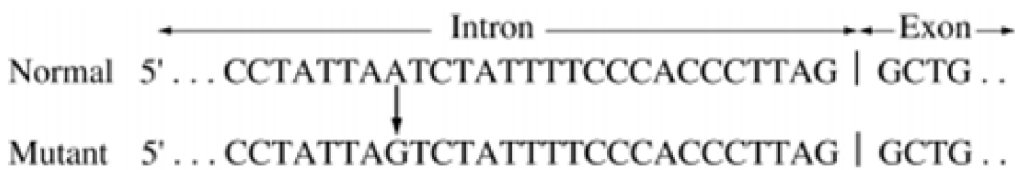
- (a) P, Q                                      (b) Q, R                                      (c) P, S                                      (d) only R

44. Bacteriophage lambda, a temperate phage has two modes of lifecycle, lytic and lysogenic. During the lysogenic cycle, the expression of the phage genes, replication genes, heads genes, tail genes, lysis genes are suppressed. The two regulatory genes CI and Cro repressor switch ON and OFF to regulate the lytic and lysogenic cycle.

The following are statements of gene regulation in lambda phage.

- (A) Expression of Cro, CI, N, Q results in Lytic cycle.  
 (B) The expression of CI is dependent on the CII and CIII  
 (C) CII protects CIII from protease degradation.  
 (D) Mutation in CI is associated with the formation of clear plaque in E.coli (ë+) lysogen.

- (a) A, B                                      (b) B, C                                      (c) B, D                                      (d) A, D

45. 

Portions of the DNA sequences of normal and mutant b-globin genes are shown above. The most plausible explanation for why the indicated mutation (changing an A to a G) results in the disease b-thalassemia is that the mutation.

- (a) changes the amino acid specified by the codon of which the altered base is part  
 (b) generates a recognition site for a restriction enzyme, so the gene is cut into two  
 (c) creates a new splice site, so that a portion of the intron is not removed  
 (d) results in an increase in the transcription of the b-globin gene

**Common statement for Q. No. 46 to 47.**

46. TATA-binding protein (TBP) is a key transcription factor in eukaryotes. A schematic representation of the 240-amino acid TBP of yeast is shown in Figure 1 below, with the positions of two mutations indicated. The boxed area represents the evolutionarily conserved C-terminal domain of TBP, and the shaded (dark) regions of this domain represent two repeated elements involved in DNA binding. One mutation (P65S) changes proline 65 to serine, and the other (I143N) changes isoleucine 143 to asparagine.

**Figure 1**

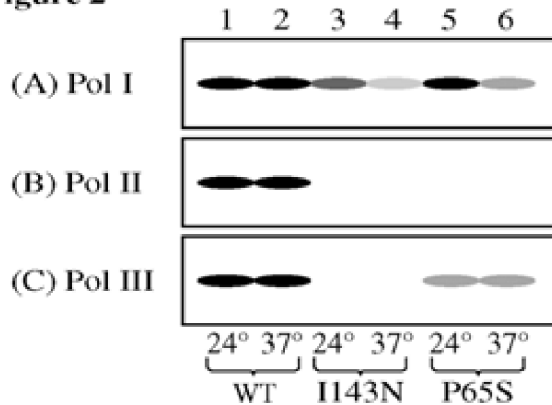


**Figure 2** below represents autoradiographs of gels containing RNA transcripts produced in extracts of wild-type or mutant cells. Lanes 1–2 are from wild-type yeast (WT), lanes 3–4 are from the I143N mutant, and lanes 5–6 are from the P65S mutant, as indicated. Figure 2A shows transcripts of a gene transcribed by RNA polymerase I (Pol I). Figure 2B shows transcripts of a gene transcribed by RNA polymerase II



(Pol II). Figure 2C shows transcripts of a gene transcribed by RNA polymerase III (Pol III). Lanes 1, 3, and 5 show transcripts produced at 24°C, and lanes 2, 4, and 6 show transcripts produced at 37°C. Shading of the bands represents signals of different intensity.

**Figure 2**



As a control, wild-type TBP was added to mutant extracts prior to transcription analysis. It was observed that wild-type TBP could restore transcription by all three RNA polymerases in mutant extracts. The controls were performed in order to check

- whether mutant transcription phenotypes are due to perturbation of TBP function
  - for equivalent RNA levels in all lanes
  - the specific activity of RNA polymerase
  - whether mutant transcription phenotypes are temperature sensitive
47. Which of the following conclusions about mutations in TBP is most consistent with the data?
- The I143N mutation affects transcription of pol II genes in a temperature-sensitive manner
  - The P65S mutation affects transcription of pol I genes in a temperature-sensitive manner.
  - Transcription of pol I, pol II, and pol III genes is equally sensitive to TBP mutations.
  - TBP function is noticeably resistant to mutation.
48. (NZB × NZW)<sub>F<sub>1</sub></sub> mice are experimental system for study of Systemic Lupus Erythematosus (SLE), an auto-immune disorder. In one such experiment following interventions were performed.

**Group of mice**

**Intervention**

- Injected with anti-CD4 mab on a weekly basis
- Injected with IFN- $\gamma$  on weekly basis
- Injected with IL-4 on weekly basis
- Injected with IL-12 on weekly basis

In which of the above groups auto-immunity symptoms will be reduced?

- P, Q
  - Q, R
  - P, R
  - R, S
49. Match the column

Pathogen	Vaccine antigen	Disease
(i) <i>Streptococcus pneumoniae</i>	(w) Toxoid	(a) Hepatitis-B
(ii) Hepatitis-B virus	(x) Bacterial capsule	(b) Tetanus
(iii) <i>Clostridium tetani</i>	(y) Virus	(c) Pneumonia
(iv) Polio virus	(z) HBs Ag	(d) Polio

Correct option is



- (a) (i)-(x)-(c), (ii)-(z)-(a), (iii)-(w)-(b), (iv)-(y)-(d)  
 (b) (i)-(z)-(a), (ii)-(x)-(c), (iii)-(w)-(d), (iv)-(y)-(b)  
 (c) (i)-(z)-(c), (ii)-(x)-(a), (iii)-(y)-(b), (iv)-(w)-(d)  
 (d) (i)-(w)-(b), (ii)-(x)-(a), (iii)-(x)-(c), (iv)-(y)-(d)
50. Macrophages infected with *Mycobacterium tuberculosis* were co-cultured with activated macrophages in following groups  
 (P) Infected macrophages + activated macrophages  
 (Q) Infected macrophages + activated macrophages + Mab to IL-12  
 (R) Infected macrophages + activated macrophages that have been knocked out for IL-12 gene  
 In which of the groups, the bacterial count will be least  
 (a) P (b) Q (c) R (d) All of them
51. CD1 knock out mice were immunized with *Mycobacterium tuberculosis*. Spleen cells were isolated and divided into 2 batches X and Y.  
 X : Treated with lipid extract of bacteria  
 Y : Treated with protein derived from bacteria  
 Cellular proliferation and activation will be seen in?  
 (a) In X and Y both (b) Only in X  
 (c) Only in Y (d) Neither in X nor in Y
52. Structural analysis of many antibodies bound to their respective antigens revealed that CDR3 of both heavy and light chains make contact with epitope. On sequence analysis it was found that variability of CDR3 is greater than that of either CDR1 or CDR2. Given below are some mechanisms that may be responsible for the greater sequence diversity in CDR3.  
 (P) Junctional flexibility (Q) N-addition  
 (R) P-addition (S) Somatic hypermutation  
 Which among these mechanisms contribute to the diversity of CDR3?  
 (a) P, Q, R (b) Q, R, S (c) P, Q, S (d) P, Q, R, S
53. A B-cell becomes immuno-competent after  
 (a) productive rearrangement of variable region heavy-chain gene segments in germ line DNA  
 (b) productive rearrangement of variable region heavy-chain and light chain gene segments in germ line DNA  
 (c) class switching, the second recombination  
 (d) Somatic hypermutation
54. After graduation, you and 19 of your closest friends (let's say 10 males and 10 females) charter a plane to go on a round the world tour. Unfortunately, you all crash land (safely) on a deserted island. No one finds you and you start a new population totally isolated from the rest of the world. Two of your friends carry (i.e. are heterozygous for) the recessive cystic fibrosis allele (c). Assuming that the frequency of this allele does not change as the population grows, what will be the chance of occurrence of cystic fibrosis on your island?  
 (a) 0.100% (b) 0.75% (c) 0.50% (d) 0.25%





59. Transport proteins involved in facilitated diffusion of small molecules and ions are integral membrane proteins that contain several, or even many transmembrane segments and therefore traverse the membrane multiple times. Functionally these proteins fall into two main classes that transport solutes in quite different ways, these proteins are carrier and channels. Which of the following statements are correct for carrier proteins?
1. Carrier proteins form hydrophilic pores through the membrane that allow the passage of solutes without a major change in the conformation of protein.
  2. Carrier proteins bind one or more solute molecules on one side of the membrane and then undergo a conformational change that transfers the solute to the other side of the membrane.
  3. Carrier proteins transport either one or two solutes.
  4. The erythropoietin glucose transporter and anion exchanger protein are examples of carrier proteins.
- (a) 1 & 4                      (b) 2 & 4                      (c) 1, 3 & 4                      (d) 2, 3 & 4
60. Proteins are targeted to or from the nucleus by virtue of having nuclear localizing signals or nuclear export signals respectively, allowing the proteins to be recognized by receptors that direct their transport through the nuclear pore complex. From the given outcomes choose only those which are correct for protein import through nuclear pore complex-
1. Nuclear localizing signal (NLS) of a cargo protein is recognized by an importin
  2. The importin-cargo complex binds to nuclear pore proteins in the cytoplasmic filaments and is transported through pore.
  3. The importin-cargo complex binds to Ran-GTP and then binds to nuclear pore proteins in the cytoplasmic filaments and is transported through pore.
  4. At the nuclear side of the envelop, Ran-GTP is hydrolyzed from the complex and releasing the cargo protein into the nucleus.
  5. At the nuclear side of the envelop, Ran-GTP binds to importin, disrupting the importin cargo- complex and releasing the cargo protein into the nucleus.
  6. The importin-ran-GTP complex is re-exported through the nuclear pore and GTPase activating proteins in the cytoplasm hydrolyses the GTP on Ran to GDP, releasing the importin.
  7. The importin-ran-GDP complex is re-exported through the nuclear pore and GDP is detach from Ran, releasing the importin.
- (a) 1, 3, 4, 7                      (b) 1, 2, 5, 6                      (c) 1, 4, 7                      (d) 1, 4, 5, 6



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**Space for Rough Work**





## CSIR-UGC-NET/JRF LIFE SCIENCES TEST SERIES-1

(Part-A + Genetics + Molecular Biology + Immunology + Cell Signaling  
+ Histochemical and Immunotechniques)

Date : 17-05-2019

### [ANSWER KEY]

#### PART-A

- |        |        |        |        |         |
|--------|--------|--------|--------|---------|
| 1. (a) | 2. (c) | 3. (c) | 4. (a) | 5. (c)  |
| 6. (d) | 7. (b) | 8. (d) | 9. (d) | 10. (a) |

#### PART-B

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 11. (a) | 12. (d) | 13. (d) | 14. (b) | 15. (c) |
| 16. (b) | 17. (a) | 18. (c) | 19. (d) | 20. (a) |
| 21. (b) | 22. (d) | 23. (a) | 24. (c) | 25. (d) |
| 26. (c) | 27. (a) | 28. (b) | 29. (a) | 30. (c) |
| 31. (c) | 32. (d) | 33. (c) | 34. (b) | 35. (d) |

#### PART-C

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 36. (b) | 37. (b) | 38. (b) | 39. (c) | 40. (c) |
| 41. (d) | 42. (a) | 43. (d) | 44. (c) | 45. (c) |
| 46. (a) | 47. (b) | 48. (c) | 49. (a) | 50. (a) |
| 51. (c) | 52. (d) | 53. (b) | 54. (d) | 55. (b) |
| 56. (d) | 57. (b) | 58. (b) | 59. (d) | 60. (b) |

