DU MPhil PhD in Botany

Topic:- DU_J18_MPHIL_BOT

1) Which of the following statements is not true for *nzz* (*NOZZLE* gene mutant) of *Arabidopsis*?

[Question ID = 2001]

1. Plays an important role in placenta and ovule primordial differentiation [Option ID = 8003]
2. Funiculus appears longer than the wild type ovules [Option ID = 8001]
3. Precocious establishment of adaxial-abaxial polarity of ovule [Option ID = 8004]
4. Integuments do not show asymmetrical growth [Option ID = 8002]

Correct Answer :-

- Plays an important role in placenta and ovule primordial differentiation [Option ID = 8003]

2) Which of the following plant defense response is not a characteristic of chewing herbivores?

[Question ID = 1986]

1. Increase in the production of volatile organic compounds like linalool and nerilidol. [Option ID = 7944]
2. Increase in levels of amino-acid conjugated jasmonates. [Option ID = 7942]
3. Increase in levels of amino acid-conjugated salicylates. [Option ID = 7943]
4. Increase in the number of plant trichomes. [Option ID = 7941]

Correct Answer :-

- Increase in levels of amino acid-conjugated salicylates. [Option ID = 7943]

3) Which of the following molecule in not a HAMP?

[Question ID = 1987]

1. Linalool [Option ID = 7946]
2. Volicitin [Option ID = 7947]
3. Inceptin [Option ID = 7945]
4. Benzyl cyanide [Option ID = 7948]

Correct Answer :-

- Linalool [Option ID = 7946]

4) Which statement about a transition state analog in an enzymatic reaction is false?

[Question ID = 1969]

1. It may function as a non-competitive inhibitor of the enzyme. [Option ID = 7876]
2. It fits better into the active site than the substrate. [Option ID = 7874]
3. It usually is a strong inhibitor of the enzyme. [Option ID = 7873]
4. It is a stable molecule and has a structure similar to the presumed transition state. [Option ID = 7875]

Correct Answer :-

- It may function as a non-competitive inhibitor of the enzyme. [Option ID = 7876]

5) Which one of the following statements is incorrect for tetrasporic embryo sac formation?

[Question ID = 1976]

1. Triploid nucleus is formed by the fusion of three nuclei at chalazal end while, one nucleus remains haploid at the micropylar end. [Option ID = 7903]
2. Meiosis results in a linear tetrad of megaspores of which either chalazal or micropylar megaspore participates in the embryo sac formation. [Option ID = 7902]
3. Coenomegaspore consists of four haploid nuclei with a common cytoplasm. [Option ID = 7904]
4. Four nuclei of coenomegaspore are arranged in a 1+2+1 manner. [Option ID = 7901]

Correct Answer :-

- Meiosis results in a linear tetrad of megaspores of which either chalazal or micropylar megaspore participates in the embryo sac formation. [Option ID = 7902]

6) Which one of the following statements is false?

[Question ID = 1989]

1. Centromeric regions have suppressed recombination. [Option ID = 7955]
2. Genetic and physical maps are collinear. [Option ID = 7953]
3. Genetic distances are equal to the actual physical distances between genes. [Option ID = 7956]
4. Some regions on the chromosome are more prone to crossing over than others. [Option ID = 7954]

Correct Answer :-

- Genetic distances are equal to the actual physical distances between genes. [Option ID = 7956]

7) Which one of the following combinations of techniques can be used for analyzing expression levels of a transgene?
(i) Southern blotting and Northern blotting
(ii) Northern blotting and Western blotting
(iii) ELISA and qRT-PCR
(iv) FISH and SSR

[Question ID = 1984]

1. i and iv only [Option ID = 7935]
2. i and iii only [Option ID = 7936]
3. ii and iii only [Option ID = 7934]
4. ii and iv only [Option ID = 7933]

Correct Answer :-

- ii and iii only [Option ID = 7934]

8) Which one of the following is not an example of Pathogen Associated Molecular Patterns (PAMP)?

[Question ID = 1985]

1. Bacterial flagellin (flg22) [Option ID = 7937]
2. Peptidoglycan (PGN) [Option ID = 7940]
3. Elongation factor Tu (EF-Tu) [Option ID = 7938]
4. Toll-like receptor (TLR) [Option ID = 7939]

Correct Answer :-

- Toll-like receptor (TLR) [Option ID = 7939]

9) Which one of the following is incorrect for CLAVATA3 gene?

[Question ID = 1975]

1. Its role is antagonistic to that of WUSCHEL gene. [Option ID = 7899]
2. CLAVATA3 gene encodes a small protein expressed in the central zone of SAM. [Option ID = 7898]
3. It is involved in maintenance of the root apical meristem. [Option ID = 7900]
4. Mutation in CLAVATA3 results in club shaped siliques in Arabidopsis thaliana. [Option ID = 7897]

Correct Answer :-

- It is involved in maintenance of the root apical meristem. [Option ID = 7900]

10) Which amino acid motifs present in the Release Factor 1 (RF1) are involved in translation, termination and peptide release from the large subunit of ribosomes in eukaryotes?

[Question ID = 1962]

1. PVT motif and GGQ motif [Option ID = 7848]
2. QQG motif and PLR motif [Option ID = 7847]
3. PQR motif and PCR motif [Option ID = 7846]
4. MVL motif and GNG motif [Option ID = 7845]

Correct Answer :-

- PVT motif and GGQ motif [Option ID = 7848]

11) Ingested plant virions evade host immune responses in white flies by associating with

[Question ID = 2002]

1. phagosomes that trigger self-recognition pathways and suppress sumoylation. [Option ID = 8008]
2. chaperones produced by gut symbionts. [Option ID = 8005]
3. protease inhibitors that inactivate gut digestive enzymes. [Option ID = 8006]
4. short interfering RNA (siRNA) molecules complementary to regions of the viral genome. [Option ID = 8007]

Correct Answer :-

- chaperones produced by gut symbionts. [Option ID = 8005]

12) Highage-specific survivorship probability in pre-reproductive and reproductive stages of an organism's life have characteristic features of which one of the following survivorship curves: [Question ID = 1996]

1. Type II [Option ID = 7982]
2. Type III [Option ID = 7983]
3. Type II & III [Option ID = 7984]
4. Type I [Option ID = 7981]

Correct Answer :-

- Type I [Option ID = 7981]

13) Identify the correct source of *bar* gene:

[Question ID = 2000]

1. *Bacillus thuringiensis* [Option ID = 7999]
2. *E. coli* [Option ID = 8000]
3. *Streptomyces hygroscopicus* [Option ID = 7998]
4. *Saccharomyces cerevisiae* [Option ID = 7997]

Correct Answer :-

- *Streptomyces hygroscopicus* [Option ID = 7998]

14) Identify the plant species from which, artemisinin, an anti-malarial drug, is extracted.

[Question ID = 1982]

1. *Rumex hastatus* [Option ID = 7926]
2. *Artemisia maritima* [Option ID = 7925]
3. *Artemisia annua* [Option ID = 7927]
4. *Cinchona officinalis* [Option ID = 7928]

Correct Answer :-

- *Artemisia annua* [Option ID = 7927]

15) Evacuation of the column of a transmission electron microscope to 10^{-4} Torr does <u>not</u> affect

[Question ID = 1988]

1. focal length of the objective lens. [Option ID = 7950]
2. life of the emitter. [Option ID = 7951]
3. breakdown of gases within the column. [Option ID = 7952]
4. mean free path of electron. [Option ID = 7949]

Correct Answer :-

- focal length of the objective lens. [Option ID = 7950]

16) *Nerium oleander* is acclimated to high temperature due to

[Question ID = 1967]

1. excessive accumulation of fatty acids. [Option ID = 7868]
2. excessive fluidity of membrane lipids. [Option ID = 7867]
3. greater degree of unsaturation of fatty acids in membrane lipids. [Option ID = 7866]
4. greater degree of saturation of fatty acids in membrane lipids. [Option ID = 7865]

Correct Answer :-

- greater degree of saturation of fatty acids in membrane lipids. [Option ID = 7865]

17) Under the given conditions, which one of the polypeptides listed below will fold into α-helix at pH 7.0?

[Question ID = 1968]

1. Polyaspartic acid [Option ID = 7870]
2. Polyalanine [Option ID = 7869]
3. Polyproline [Option ID = 7871]
4. Polylysine [Option ID = 7872]

Correct Answer :-

- Polyalanine [Option ID = 7869]

18) Gynoecium in family Asteraceae is [Question ID = 2009]

1. monocarpellary, unilocular having many ovules on marginal placentation. [Option ID = 8035]
2. bicarpellary, syncarpous, unilocular having single ovule on basal placentation. [Option ID = 8033]
3. bicarpellary, syncarpous, bilocular having two ovules on axile placentation. [Option ID = 8036]
4. bicarpellary, syncarpous, bilocular having many ovules on axile placentation. [Option ID = 8034]

Correct Answer :-

- bicarpellary, syncarpous, unilocular having single ovule on basal placentation. [Option ID = 8033]

19) In *Oenothera parviflora*, permanent translocation heterozgosity is observed. Which of the following sentences is <u>not</u> true about *O. parviflora*?

[Question ID = 1964]

1. A ring of 14 chromosomes is formed at meiosis. [Option ID = 7853]
2. Only heterozygotes survive. [Option ID = 7854]
3. Only homozygotes survive. [Option ID = 7855]
4. Heterozygosity is maintained due to balanced lethal system. [Option ID = 7856]

Correct Answer :-

- Only homozygotes survive. [Option ID = 7855]

20) Addition of which factor/s converts bacterial core RNA polymerase into a holozyme that can initiate transcription only at promoters?

[Question ID = 1961]

1. β-70 and σ-30 [Option ID = 7843]
2. α-70 [Option ID = 7844]
3. TFIIB [Option ID = 7841]
4. σ-70 [Option ID = 7842]

Correct Answer :-

- σ-70 [Option ID = 7842]

21) Endohydric mosses refers to those which

[Question ID = 2006]

1. lack the perstome spore dispersal occur only on decay of the sporophyte. [Option ID = 8024]
2. conduct water and minerals through the specialized conducting cells. [Option ID = 8022]
3. absorb water and minerals through whole surface of the plant. [Option ID = 8021]
4. have the erect growth form. [Option ID = 8023]

Correct Answer :-

- conduct water and minerals through the specialized conducting cells. [Option ID = 8022]

22) In the lactose operon, the *lac* operator (*lacO*) was established to be *cis*-acting because

[Question ID = 1965]

1. *lacO* is physically linked to the operon. [Option ID = 7859]
2. a single functional *lacO* copy can regulate two copies of the *lac* operon in a merozygote. [Option ID = 7857]
3. a single functional *lacO* cannot regulate two copies of the *lac* operon in a merozygote. [Option ID = 7860]

4. mutations in *lacO* affects lactose uptake. [Option ID = 7858]

Correct Answer :-

- a single functional *lacO* cannot regulate two copies of the *lac* operon in a merozygote. [Option ID = 7860]

23) During photosynthesis, oxidation of water in chloroplasts occurs in/on [Question ID = 1990]

1. outer membrane [Option ID = 7960]
2. thylakoidal membranes [Option ID = 7958]
3. stroma [Option ID = 7959]
4. intra-thylakoidal space [Option ID = 7957]

Correct Answer :-

- intra-thylakoidal space [Option ID = 7957]

24) Species of which of the following genus is a good source of glycerol and β-carotene?

[Question ID = 1973]

1. *Chondrus* [Option ID = 7891]
2. *Eucheuma* [Option ID = 7892]
3. *Dunaliella* [Option ID = 7890]
4. *Spirulina* [Option ID = 7889]

Correct Answer :-

- *Dunaliella* [Option ID = 7890]

25) Agar-agar is <u>not</u> obtained from

[Question ID = 1995]

1. *Gracilaria* [Option ID = 7978]
2. *Fucus* [Option ID = 7980]
3. *Gigartina* [Option ID = 7979]
4. *Gelidium* [Option ID = 7977]

Correct Answer :-

- *Fucus* [Option ID = 7980]

26) Homeodomain, present in the DNA binding proteins, contains_____ motifs. [Question ID = 1966]

1. Leucine zipper [Option ID = 7864]
2. Zinc finger [Option ID = 7863]
3. Helix-loop-helix [Option ID = 7861]
4. Helix-turn-helix [Option ID = 7862]

Correct Answer :-

- Helix-turn-helix [Option ID = 7862]

27) A study finds that stray cats have whiskers about 10 cm long. After about 20 generations of stabilizing selection, what do you expect to see? [Question ID = 1980]

1. Even more cats will have whiskers 10 cm long. [Option ID = 7919]
2. Most cats will have whiskers greater than 20 cm long. [Option ID = 7917]
3. Most cats will have whiskers less than 10 cm long. [Option ID = 7920]
4. Most cats will have whiskers either less than 10 cm or greater than 20 cm long. [Option ID = 7918]

Correct Answer :-

- Even more cats will have whiskers 10 cm long. [Option ID = 7919]

28) White rot basidiomycetous fungi are good source of [Question ID = 1999]

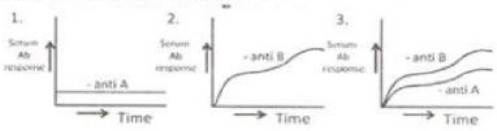
1. lignase. [Option ID = 7995]
2. amylase. [Option ID = 7993]
3. protease. [Option ID = 7994]
4. lipase. [Option ID = 7996]

Correct Answer :-

- lignase. [Option ID = 7995]

29)

There are three substances A, B, and C. Given below are the pattern of immunological responses in rabbits when (i) A is administered along with C, (ii) B is administered along with C, and (iii) A is conjugated with B and administered along with C.



Which of the following is the correct identifications?

[Question ID = 2008]

1. A- hapten, B-adjuvant, C- protein [Option ID = 8032]
2. A- hapten, B-protein, C-adjuvant [Option ID = 8030]
3. A-protein, B-hapten, C-adjuvant [Option ID = 8029]
4. A-protein, B-adjuvant, C- hapten [Option ID = 8031]

Correct Answer :-

- A- hapten, B-protein, C-adjuvant [Option ID = 8030]

30)

	Column A	Column B
(i)	Negative selection marker	(a) field selection of transgenic plants
(ii)	beta-carotene	(b) constitutive promoter
(iii)	*bar* gene	(c) golden rice
(iv)	Figwort Mosaic Virus	(d) developmentally regulated promoter

Which one of the following options correctly matches terms of Column A with those of Column B?

[Question ID = 1983]

1. i-b, ii-d, iii-b, iv-a [Option ID = 7931]
2. i-b, ii-a, iii-d, iv-c [Option ID = 7929]
3. i-d, ii-c, iii-a, iv-b [Option ID = 7932]
4. i-c, ii-a, iii-d, iv-b [Option ID = 7930]

Correct Answer :-

- i-d, ii-c, iii-a, iv-b [Option ID = 7932]

31) What would the output of the following PERL script?

```
for($x=2;$x<3;$x++)
{$x++; print "$x.\n";}
```

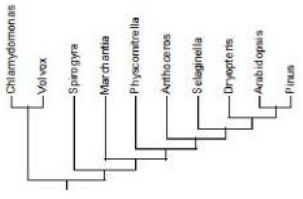
[Question ID = 2007]

1. 2 [Option ID = 8025]
2. 0 [Option ID = 8028]
3. 3 [Option ID = 8026]
4. Infinite loop [Option ID = 8027]

Correct Answer :-

- 3 [Option ID = 8026]

32) Which of the following statements is correct?



[Question ID = 1997]

1. *Arabidopsis* and *Pinus* are more closely related to each other than either is to *Dryopteris* [Option ID = 7987]
2. *Marchantia*, *Physcomitrella* and *Anthoceros* form a clade called Bryophyta [Option ID = 7988]
3. *Selaginella* and *Dryopteris* are more closely related to each other than either is to *Anthoceros*. [Option ID = 7986]
4. The green alga *Spirogyra* is more closely related to the land plants than it is to the other green algae, *Chlamydomonas* and *Volvox*. [Option ID = 7985]

Correct Answer :-

33) A name spelled exactly like a validly published name for a taxon of the same rank based on different type is called [Question ID = 1981]

1. Synonym. [Option ID = 7924]
2. Basionym. [Option ID = 7922]
3. Homonym. [Option ID = 7923]
4. Autonym. [Option ID = 7921]

Correct Answer :-

- Homonym. [Option ID = 7923]

34) A nicked double stranded circular plasmid, in which nick is present only on one of the strands, can be produced by [Question ID = 1972]

1. ligating 5′ hemi-phosphorylated double stranded insert with double stranded vector having compatible ends. [Option ID = 7887]
2. ligating 5′ non-phosphorylated double stranded insert with double stranded vector (digested with an enzyme present in its MCS followed by alkaline phosphatase treatment) having compatible ends. [Option ID = 7885]
3. ligating double stranded insert with double stranded vector (digested with an enzyme present in its MCS followed by alkaline phosphatase treatment) having compatible ends. [Option ID = 7886]
4. ligating phosphorylated double stranded insert with double stranded vector having compatible ends. [Option ID = 7888]

Correct Answer :-

- ligating 5′ hemi-phosphorylated double stranded insert with double stranded vector having compatible ends. [Option ID = 7887]

35) A RNA-protein complex which also acts as reverse transcriptase, and has inherent RNA-DNA-helicase activity is exemplified by: [Question ID = 1994]

1. Telomere [Option ID = 7975]
2. Centromere [Option ID = 7974]
3. Ribozyme [Option ID = 7976]
4. Ribosome [Option ID = 7973]

Correct Answer :-

- Telomere [Option ID = 7975]

36) In a genetic transformation experiment, a researcher failed to add the selection agent (antibiotic) to the shoot regeneration medium for selection of transgenic plants. In the absence of any other confounding factors, which one of the following statements is expected to be correct? [Question ID = 1991]

1. Transgenic plants cannot be generated from the above experiment. [Option ID = 7963]
2. The number of regenerating shoots is comparable to results obtained in the "negative control" of the experiment. [Option ID = 7962]
3. The number of regenerating shoots would be drastically reduced in this experiment as compared to experiments in which the selection agent was added. [Option ID = 7961]
4. The regenerating shoots would consist of a mixture of transgenic and non-transgenic plants. [Option ID = 7964]

Correct Answer :-

- The regenerating shoots would consist of a mixture of transgenic and non-transgenic plants. [Option ID = 7964]

37) Soil management practices that reduce soil erosion, such as conservation tillage and contour bunds, and promote rapid canopy cover during early vegetative growth helps in the reduction of losses of one of the following to the surface water systems: [Question ID = 2003]

1. Nitrogen [Option ID = 8009]
2. Micro nutrients [Option ID = 8012]
3. Phosphorus [Option ID = 8010]
4. Potassium [Option ID = 8011]

Correct Answer :-

- Phosphorus [Option ID = 8010]

38) Which of the following has highest redox potential? [Question ID = 2005]

1. Oxygen [Option ID = 8020]

2. FAD [Option ID = 8019]
3. NAD [Option ID = 8017]
4. FMN [Option ID = 8018]

Correct Answer :-

- Oxygen [Option ID = 8020]

39) Which of the following conditions are favourable for cyclic photophosphorylation? [Question ID = 2010]

1. Anaerobic condition and low light intensity [Option ID = 8040]
2. Anaerobic condition only [Option ID = 8037]
3. Aerobic conditions and low light intensity [Option ID = 8039]
4. Aerobic conditions and high light intensity [Option ID = 8038]

Correct Answer :-

- Anaerobic condition and low light intensity [Option ID = 8040]

40) Which of the following is correct? [Question ID = 1979]

1. Variation in populations can only be the result of genetic drift. [Option ID = 7913]
2. Variation is necessary for genetic drift to occur. [Option ID = 7914]
3. Variation is not a necessary starting point for natural selection to occur. [Option ID = 7915]
4. All variations in populations have a genetic basis. [Option ID = 7916]

Correct Answer :-

- Variation is necessary for genetic drift to occur. [Option ID = 7914]

41) Which of the following statement is correct about cytoskeleton filaments? [Question ID = 2004]

1. Free energy from the hydrolysies of ATP derives polymerization of tubulins. [Option ID = 8013]
2. Free energy from the hydrolysies of GTP drives the polymerization of actin [Option ID = 8014]
3. Kinesins move cargoes along a microtubule towards the positive negative (-) ends. [Option ID = 8015]
4. Basal bodies organize the microtubules in eukaryotic cilia and flagella. [Option ID = 8016]

Correct Answer :-

- Basal bodies organize the microtubules in eukaryotic cilia and flagella. [Option ID = 8016]

42) Which one of the following microscopy is most suitable to analyze optical anisotropy? [Question ID = 1963]

1. Phase Contrast microscopy. [Option ID = 7851]
2. Polarizing microscopy. [Option ID = 7852]
3. Nomarski Differential Interference Contrast microscopy. [Option ID = 7849]
4. Confocal Laser Scanning microscopy. [Option ID = 7850]

Correct Answer :-

- Polarizing microscopy. [Option ID = 7852]

43) Effector triggered immunity (ETI) in plants

[Question ID = 1992]

1. is a slow response with lesser amplitude of defense than PTI response. [Option ID = 7967]
2. is an accelerated and amplified PTI response and results in hypersensitive response. [Option ID = 7966]
3. is an accelerated and amplified PAMP-triggered immunity (PTI) response, which however does not result in hypersensitive response. [Option ID = 7965]
4. has lesser amplitude of defense than PTI response, but it is long lasting. [Option ID = 7968]

Correct Answer :-

- is an accelerated and amplified PTI response and results in hypersensitive response. [Option ID = 7966]

44) You are provided with a polyclonal serum from rabbit containing RuBisCo antibodies to do western blotting. Which one of the following secondary antibodies should be used? [Question ID = 1998]

1. Anti-goat secondary antibodies raised in rabbit. [Option ID = 7992]
2. Anti-goat secondary antibodies raised in goat. [Option ID = 7991]
3. Anti-rabbit secondary antibodies raised in goat. [Option ID = 7990]
4. Anti-rabbit secondary antibodies raised in rabbit. [Option ID = 7989]

Correct Answer :-

- Anti-rabbit secondary antibodies raised in goat. [Option ID = 7990]

45) The functional group in anion exchange resins are usually

[Question ID = 1970]

1. acidic. [Option ID = 7877]
2. basic. [Option ID = 7878]
3. neutral. [Option ID = 7879]
4. both acidic and basic. [Option ID = 7880]

Correct Answer :-

- basic. [Option ID = 7878]

46) The r-strategist organisms have one of the following features

[Question ID = 1978]

1. More parental care [Option ID = 7912]
2. Produce in large numbers [Option ID = 7911]
3. Grow in predictable environment [Option ID = 7909]
4. Controlled by the carrying capacity [Option ID = 7910]

Correct Answer :-

- Produce in large numbers [Option ID = 7911]

47) The Shapiro-Wilk test is used the determine whether or not a random sample of values follows:

[Question ID = 1993]

1. Poisson distribution [Option ID = 7971]
2. Hypergeomatric distribution [Option ID = 7972]
3. Normal Distribution [Option ID = 7969]
4. Binomial distribution [Option ID = 7970]

Correct Answer :-

- Normal Distribution [Option ID = 7969]

48) The homeotic genes *APETALA1, PISTILLATA* and *AGAMOUS* are involved in stamen formation in *Arabidopsis*. Their respective orthologs in Snapdragon are

[Question ID = 1977]

1. *PLENA, GLOBOSA* and *DEFICIENS* [Option ID = 7905]
2. *DEFICIENS, SQUAMOSA,* and *PLENA* [Option ID = 7906]
3. *FARINELLI, PLENA* and *SQUAMOSA* [Option ID = 7908]
4. *SQUAMOSA, GLOBOSA* and *FARINELLI* [Option ID = 7907]

Correct Answer :-

- *SQUAMOSA, GLOBOSA* and *FARINELLI* [Option ID = 7907]

49) Microphylls of pteridophytes are

[Question ID = 1974]

1. leaves with groups of sporangia on their abaxial surface. [Option ID = 7895]
2. leaves with microsporangia on their adaxial surface. [Option ID = 7896]
3. leaves with branched vascular bundles and having leaf gap at divergent point of the leaf trace. [Option ID = 7894]
4. scaly or needle like leaves with unbranched vascular bundles and no leaf gap. [Option ID = 7893]

Correct Answer :-

- scaly or needle like leaves with unbranched vascular bundles and no leaf gap. [Option ID = 7893]

50) Recombinant molecules generated by ligating an insert in a replacement phage vector (in which *red* and *gam* genes are present in the central stuffer fragment) can form reasonably sized plaques. The requirements for this are:

[Question ID = 1971]

1. decrease in activity of Exonuclease V of the host cell. [Option ID = 7881]

2. RecA+ *E. coli* and *chi* sequences on vector arms. [Option ID = 7882]
3. expression of rexA and rexB phage proteins. [Option ID = 7884]
4. presence of P2 lysogen in *E. coli*. [Option ID = 7883]

Correct Answer :-

- RecA+ *E. coli* and *chi* sequences on vector arms. [Option ID = 7882]