

DU MPhil PhD in Botany

Topic:- BOT MPHIL

1) *Cryphonectria hypovirus 1* overcomes RNA silencing mediated defence response of its fungal host *Cryphonectria parasitica* by

[Question ID = 10038]

1. Production of a host encoded suppressor protein
[Option ID = 40149]
2. Production of a virus encoded suppressor protein
[Option ID = 40150]
3. Down-regulation of host Dicer-like 2 (DCL2) nuclease
[Option ID = 40151]
4. Inducing a feedback loop that activates SAR in the host plant of *C. parasitica*
[Option ID = 40152]

2) Genomic flexibility of prokaryotic viruses *cannot* be attributed to

[Question ID = 10039]

1. Frequent recombination
[Option ID = 40153]
2. Lateral gene transfer between viruses and their host
[Option ID = 40154]
3. Host modification system
[Option ID = 40155]
4. Gene gain and loss
[Option ID = 40156]

3) In Lysogenic phase of the life cycle of bacteriophages, 'Lysogen' is the [Question ID = 10040]

1. Bacterial host cell that contains viral prophage [Option ID = 40157]
2. Viral genetic material that enters bacterial host cells [Option ID = 40158]
3. Viral protein that helps in entry of prophage into bacterial host cells [Option ID = 40159]
4. Bacterial protein that helps in entry of prophage into bacterial host cells [Option ID = 40160]

4) Which of the following differentiates Archaeobacteria from Eubacteria? [Question ID = 10041]

1. In archaeobacteria, membrane lipids have branched hydrocarbons linked to glycerol by ester bonds [Option ID = 40161]
2. In archaeobacteria, membrane lipids have branched hydrocarbons linked to glycerol by ether bonds [Option ID = 40162]
3. In eubacteria, cells walls have peptidoglycans N-acetylglucosamine and N-acetyltalosaminuronic acid [Option ID = 40163]
4. In eubacteria, membrane lipids have unbranched hydrocarbons linked to glycerol by ether bonds [Option ID = 40164]

5) Which of the following is a false statement? [Question ID = 10042]

1. In phylograms, branch lengths are proportional to the amount of change [Option ID = 40165]
2. In phylogenetic tress, free rotation is possible around each of the horizontal branches at their nodes [Option ID = 40166]
3. Mitochondrial genes accumulate mutations more rapidly as compared to chloroplast genes in plants [Option ID = 40167]
4. Super tree is a single phylogenetic tree that compiles many trees with overlapping taxa into a single comprehensive tree [Option ID = 40168]

6) Which of the following statements related to nomenclature is true?

[Question ID = 10043]

1. *Strychnos nux-vomica* is a trinomial
[Option ID = 40169]
2. *Bambusa bambos* is a tautonym
[Option ID = 40170]
3. Variety is designated by the abbreviation 'var.' in italics
[Option ID = 40171]
4. The abbreviation cv. should not be used to denote a cultivar
[Option ID = 40172]

7) In a situation where the calculated t value is more than the critical t value, which one of the following options is correct? [Question ID = 10044]

1. Accept null hypothesis [Option ID = 40173]
2. Reject null hypothesis [Option ID = 40174]
3. Remove pseudo-replication of data [Option ID = 40175]
4. Reject alternate hypothesis [Option ID = 40176]

8) PhyloCode and Rank-based systems are similar in all of the following, except[Question ID = 10045]

1. Establishment of a name requires publication and registration. [Option ID = 40177]
2. Conservation rule is used to give priority to a later published name. [Option ID = 40178]
3. Priority is taken into consideration while determining the correct name. [Option ID = 40179]
4. Date of publication is the main criteria for establishing precedence. [Option ID = 40180]

9) Which of the following is not an example of homoplasy?

[Question ID = 10046]

1. Leaves of pitcher plant and spines of cactus
[Option ID = 40181]
2. Tendrils in angiosperms
[Option ID = 40182]
3. Gametophytic leaves of liverwort and Sporophytic leaves of lycopod
[Option ID = 40183]
4. Absence of perianth in *Lemna*
[Option ID = 40184]

10) Which of the following is a characteristic feature of ancestral angiosperm flowers?[Question ID = 10047]

1. Unisexual flowers [Option ID = 40185]
2. Undifferentiated perianth [Option ID = 40186]
3. Zygomorphic flowers [Option ID = 40187]
4. Spirally arrangement stamens [Option ID = 40188]

11) Angiosperms are estimated to have evolved about[Question ID = 10048]

1. 267 - 187 Mya [Option ID = 40189]
2. 193 - 146 Mya [Option ID = 40190]
3. 420 - 417 Mya [Option ID = 40191]
4. 184 - 131 Mya [Option ID = 40192]

12) Which of the following is incorrectly associated?[Question ID = 10049]

1. UPGMA - Cluster analysis [Option ID = 40193]
2. Bayesian Analysis - Posterior probabilities [Option ID = 40194]
3. Maximum Likelihood - Occam's razor [Option ID = 40195]
4. Neighbor Joining - Phylogram [Option ID = 40196]

13) Importance of axial polarity in plant morphogenesis has been demonstrated by inducing symmetric division in the zygote of which mutant of *Arabidopsis thaliana*?

[Question ID = 10050]

1. *gnom*
[Option ID = 40197]
2. *fis*
[Option ID = 40198]
3. *stm*
[Option ID = 40199]
4. *wus*
[Option ID = 40200]

14) In organ developmental studies, clonal analysis refers to[Question ID = 10051]

1. determining the number of clones formed by bulbils. [Option ID = 40201]
2. identifying in vitro induced somaclonal variation. [Option ID = 40202]
3. mapping of cell lineages derived from an apical cell. [Option ID = 40203]
4. identification of apomictic seeds. [Option ID = 40204]

15) Which one of the following is a commercial source of phloem fibers?

[Question ID = 10052]

1. *Corchorus capsularis*
[Option ID = 40205]
2. *Agave sisalana*
[Option ID = 40206]
3. *Musa textilis*
[Option ID = 40207]
4. *Gossypium hirsutum*
[Option ID = 40208]

16) Which of the following cells are implicated in perception of gravity in a root?[Question ID = 10053]

1. Stem cells [Option ID = 40209]

2. Root apical meristem cells [Option ID = 40210]
3. Statocyte cells [Option ID = 40211]
4. Border cells [Option ID = 40212]

17) Following are some of the mechanisms of humoral and cell-mediated immune responses to viruses. Match the effector molecule/cells (Column A) with their activities (Column B).

Column A	Column B
A. Natural Killer (NK) Cells	I. Prevents infection or re-infection
B. Cytotoxic T-Cells (CTLs)	II. Lysis of enveloped viral particles
C. IFN-g	III. Kills virus-infected self-cells
D. IgA	IV. Direct anti-viral activity
E. Antibody-activated complements	V. Kill virus-infected cells by ADCC

[Question ID = 10054]

1. A - V, B - III, C - IV, D - I, E - II [Option ID = 40213]
2. A - III, B - V, C - IV, D - I, E - II [Option ID = 40214]
3. A - IV, B - V, C - III, D - II, E - I [Option ID = 40215]
4. A - V, B - IV, C - II, D - III, E - I [Option ID = 40216]

18) Positioning of a flower on an inflorescence requires interplay of auxin with which one of the following genes?

[Question ID = 10055]

1. *APETALA1*
[Option ID = 40217]
2. *AGAMOUS*
[Option ID = 40218]
3. *FT*
[Option ID = 40219]
4. *LEAFY*
[Option ID = 40220]

19) Which of the following pair of genes represents the correct combination of orthologs involved in floral organ identity among *Arabidopsis thaliana* and *Antirrhinum majus*?

[Question ID = 10056]

1. *APETALA3* - *GLOBOSA*
[Option ID = 40221]
2. *APETALA3* - *DEFICIENS*
[Option ID = 40222]
3. *APETALA3* - *PLENA*
[Option ID = 40223]
4. *APETALA3* - *SUPERWOMAN1*
[Option ID = 40224]

20) Which of the following is incorrect for *E.coli* protein over-expression/purification using pBAD expression system?

[Question ID = 10057]

1. It is an L-arabinose dependent process
[Option ID = 40225]
2. It is designed for the tight control of background expression
[Option ID = 40226]
3. Linear increase in gene expression with increasing inducer concentration is observed
[Option ID = 40227]
4. Over-expressed protein is purified using immobilized metal affinity chromatography (IMAC) with Ni²⁺
[Option ID = 40228]

21) Which of the following statements is *not* true for commercial Bt cotton plants expressing a codon optimized transgene?

[Question ID = 10058]

1. Expression levels of the transgenic Bt endotoxin is high
[Option ID = 40229]
2. LD50 provided by transgenic Bt endotoxin is adequate for control of targeted insect pest.
[Option ID = 40230]
3. Build-up of resistance against the targeted insect pest is less likely
[Option ID = 40231]
4. Chemical synthesis of the transgene is usually necessary

[Option ID = 40232]

22) Which of the following cannot be considered an example of the co-evolutionary arms race between Plant and its Herbivore?

[Question ID = 10059]

1. Production of Glucosinolates in Brassicales against cabbage butterflies

[Option ID = 40233]

2. Difference in the number and density of trichomes on leaf surfaces.

[Option ID = 40234]

3. Release of Indole by plant leaves upon attack.

[Option ID = 40235]

4. Release of cysteine proteases in latex of Euphorbia species upon wounding

[Option ID = 40236]

23) Which of the following molecules is most likely to be associated with induced, indirect, responses of plants to herbivory?**[Question ID = 10060]**

1. Defensin [Option ID = 40237]
2. Nonatriene [Option ID = 40238]
3. Hydrogen peroxide [Option ID = 40239]
4. Kunitz trypsin inhibitor [Option ID = 40240]

24) Tobacco plants were transformed with an antisense construct that silenced the gene encoding lipoxygenase (as *lox-*). Which of the following is *not* likely to be an outcome of growing these mutants in the field?

[Question ID = 10061]

1. Impaired production of Jasmonic acid

[Option ID = 40241]

2. Reduced fitness costs due to lowered production of PR proteins

[Option ID = 40242]

3. Increased resistance against attack by chewing insects

[Option ID = 40243]

4. Change in type and groups of insects that typically attack tobacco plants

[Option ID = 40244]

25) A group of scientists wanted to create transgenic plants that were resistant to a potyvirus (+ stranded RNA genome) using VIGS. Which of the following transgenes would they prefer?**[Question ID = 10062]**

1. A highly conserved, non-coding fragment of the coat protein gene [Option ID = 40245]
2. A highly conserved, full-length, translatable coat protein gene [Option ID = 40246]
3. A variable region of a VIGS suppressor gene, so that multiple viruses can be targeted [Option ID = 40247]
4. A variable region of a VIGS suppressor gene, so that multiple viral strains can be targeted [Option ID = 40248]

26) Field resistance in the pink cotton bollworm to 1st generation transgenic Bt cotton in India can be best attributed to:**[Question ID = 10063]**

1. Single mutation event in the E-Cadherin gene [Option ID = 40249]
2. Alternative splicing events in the E-Cadherin gene [Option ID = 40250]
3. Impaired binding of Cry I Ac domain II to aminopeptidase receptor in the gut [Option ID = 40251]
4. Lack of adequate refugia for insects susceptible to Cry I Ac [Option ID = 40252]

27) The pheromone synthesized via β -carotene, and responsible for sexual differentiation in Zygomycetes is**[Question ID = 10064]**

1. Trisporic acid [Option ID = 40253]
2. Glomalin [Option ID = 40254]
3. Acetic acid [Option ID = 40255]
4. Carotenoids [Option ID = 40256]

28) Plant signals that are released by roots to induce hyphal branching in arbuscular mycorrhizal fungi is:**[Question ID = 10065]**

1. Strigalactones [Option ID = 40257]
2. Flavanoids [Option ID = 40258]
3. Lectins [Option ID = 40259]
4. Glycoproteins [Option ID = 40260]

29) Penetration of host by *Magnaporthe oryzae* is facilitated by**[Question ID = 10066]**

1. Turgor pressure generated in the appressorium [Option ID = 40261]
2. Cell wall hydrolyzing enzymes [Option ID = 40262]
3. Combination of turgor pressure generated in the appressorium and hydrolyzing enzymes [Option ID = 40263]
4. Insects, natural opening and wounds [Option ID = 40264]

30) What is the rate of population growth per unit of time when $r = 0.1$, $N = 100$ and $K = 300$?**[Question ID = 10067]**

1. 4.66 [Option ID = 40265]
2. 6.66 [Option ID = 40266]
3. 8.66 [Option ID = 40267]
4. 10.66 [Option ID = 40268]

31) Robert Paine (1966) proposed that the feeding habit of a few species has a direct influence on the community structure. He called these species as[Question ID = 10068]

1. Umbrella species [Option ID = 40269]
2. Priority species [Option ID = 40270]
3. Keystone species [Option ID = 40271]
4. Flagship species [Option ID = 40272]

32) In a static life table, the notation $l_x = n_{x_1} / n_{x_0}$ is denoted by

[Question ID = 10069]

1. Number of individuals dying at the beginning of "age interval x", and the beginning of "age interval x+1"
[Option ID = 40273]
2. Number of individuals alive during "age interval x"
[Option ID = 40274]
3. Number of individuals at the beginning of "age interval x+1"
[Option ID = 40275]
4. Proportion of original individuals (%) surviving to beginning of "age interval x"
[Option ID = 40276]

33) Armen Takhtajan (1986) divided the floristic regions of the world into six major kingdoms. The Indian region comes under kingdoms.[Question ID = 10070]

1. Palaeotropical and Neotropical [Option ID = 40277]
2. Holarctic and Neotropical [Option ID = 40278]
3. Holarctic and Palaeotropical [Option ID = 40279]
4. Holarctic and Cape [Option ID = 40280]

34) The equilibrium model of Island biogeography is a balance between which one of the following combination of phenomena?[Question ID = 10071]

1. Immigration and extinction [Option ID = 40281]
2. Immigration and emigration [Option ID = 40282]
3. Extinction and emigration [Option ID = 40283]
4. Extinction and species isolation [Option ID = 40284]

35) Which one of the following factors could potentially explain variations in expression levels of a transgene among different transgenic plants generated using the same T-DNA construct?[Question ID = 10072]

1. Strength of promoter used to express the transgene [Option ID = 40285]
2. Stability of the mRNA encoded by the transgene [Option ID = 40286]
3. Codon usage of the transgene [Option ID = 40287]
4. Site of integration of the transgene in the nuclear genome [Option ID = 40288]

36) Which one of the following experimental approaches *cannot* be used for evaluating transgene expression levels in transgenic plants?

[Question ID = 10073]

1. Northern blotting
[Option ID = 40289]
2. ELISA
[Option ID = 40290]
3. Western blotting
[Option ID = 40291]
4. Southern blotting
[Option ID = 40292]

37) Match List I with List II

List I	List II
A. <i>Papaver somniferum</i>	I. Model Legume
B. <i>Lotus japonicus</i>	II. Oilseed crop
C. <i>Populus trichocarpa</i>	III. Morphine
D. <i>Carthamus tinctorius</i>	IV. First tree genome sequence

Choose the correct answer from the options given below:

[Question ID = 10074]

1. A - II, B - IV, C - I, D - III [Option ID = 40293]
2. A - II, B - III, C - I, D - IV [Option ID = 40294]
3. A - IV, B - III, C - II, D - I [Option ID = 40295]

4. A - III, B - I, C - IV, D - II [Option ID = 40296]

38) Which one of the following pairs is matched *correctly*?

[Question ID = 10075]

1. Crop domestication - Increased genetic diversity

[Option ID = 40297]

2. High cytokinin : auxin ratio - Root morphogenesis

[Option ID = 40298]

3. Integration of T-DNA in nuclear genome - Homologous recombination

[Option ID = 40299]

4. Non-conditional negative selection marker gene - Developmentally regulated promoter

[Option ID = 40300]

39) Crosses between maize and teosinte results in [Question ID = 10076]

1. No hybrids [Option ID = 40301]

2. Fertile hybrids [Option ID = 40302]

3. Sterile hybrids [Option ID = 40303]

4. Eliminate one genome resulting in haploid production [Option ID = 40304]

40) Which of the following statements is *false* for lactose operon mutants having mutation in operator region?

[Question ID = 10077]

1. Repressor molecule will not be able to bind to the operator.

[Option ID = 40305]

2. The mutant will have constitutive expression of the lac operon in absence of glucose.

[Option ID = 40306]

3. The mutant will have constitutive expression of the lac operon in presence of cAMP.

[Option ID = 40307]

4. The mutant will have inducible expression in the presence of glucose.

[Option ID = 40308]

41) Which of the following is *false* for quantitative traits?

[Question ID = 10078]

1. Several genotypes may produce same phenotype

[Option ID = 40309]

2. Individual genes governing the trait do not follow Mendelian inheritance

[Option ID = 40310]

3. They are polygenic in nature

[Option ID = 40311]

4. The phenotypic segregation ratios are not similar to the typical Mendelian ratios

[Option ID = 40312]

42) Which of the following is a hybridization-based DNA marker system? [Question ID = 10079]

1. RFLP [Option ID = 40313]

2. SSR [Option ID = 40314]

3. RAPD [Option ID = 40315]

4. AFLP [Option ID = 40316]

43) Restarting transcription by generating a new 3'-end by the stalled RNA polymerase requires:

[Question ID = 10080]

1. TFIIS in eukaryotes, and *Gre* factors in prokaryotes

[Option ID = 40317]

2. TFIID in both eukaryotes and prokaryotes

[Option ID = 40318]

3. TFIIE in eukaryotes, and *rut* factors in prokaryotes

[Option ID = 40319]

4. TFIIH in eukaryotes, and *rho* in prokaryotes

[Option ID = 40320]

44) A deletion in the thumb domain of DNA polymerase will affect

[Question ID = 10081]

1. binding of DNA as it exits the active site thus affecting only processivity

[Option ID = 40321]

2. both rotation and positioning of dsDNA template at the active site

[Option ID = 40322]

3. catalytic site formation, polymerization and proofreading function

[Option ID = 40323]

4. rotation of dsDNA template only

[Option ID = 40324]

45) Which of the following processes *do not* play a role in polymerization of G-actin into F-actin?

[Question ID = 10082]

1. Disassociation of G-actin bound to Profilin

[Option ID = 40325]

2. Dynamic instability of the actin filaments

[Option ID = 40326]

3. Increase in levels of intracellular G-actin monomers

[Option ID = 40327]

4. Polarity of phosphorylation and dephosphorylation along the actin filament

[Option ID = 40328]

46) Entry of a newly synthesized Type I membrane protein into the endoplasmic reticulum is facilitated by [Question ID = 10083]

1. N terminal cleavable signal peptide [Option ID = 40329]
2. C terminal H/KDEL cleavable sequence motif [Option ID = 40330]
3. C terminal di lysine cleavable sequence motif [Option ID = 40331]
4. Binding of ERD2 like receptor [Option ID = 40332]

47) Which of the following represents a *correct* combination?

[Question ID = 10084]

1. Maryland mammoth variety- Chailakhyan-hormonal theory of plant development

[Option ID = 40333]

2. Carrot protoplast- Waddington-Totipotency

[Option ID = 40334]

3. H3K9methylation- piwiRNA-euchromatin

[Option ID = 40335]

4. Maryland mammoth variety-Garner and Allard-Photoperiod

[Option ID = 40336]

48) Which of the following is *not* a type of β -lactam antimicrobial?

[Question ID = 10085]

1. Penicillin

[Option ID = 40337]

2. Glycopeptides

[Option ID = 40338]

3. Cephalosporins

[Option ID = 40339]

4. Monobactams

[Option ID = 40340]

49) Which of the following is *not* true for Archaea?

[Question ID = 10086]

1. Cell wall is made up of pseudopeptidoglycan

[Option ID = 40341]

2. They have lipid membrane of ester bonds with fatty acids

[Option ID = 40342]

3. Archaea are Methanogens, Halophiles, Thermoacidophiles

[Option ID = 40343]

4. Archaea reproduce asexually by binary fission, fragmentation, or by the budding process.

[Option ID = 40344]

50) Which one of the following would be used to analyze homology between a translated nucleotide sequence (as query) and a protein database (subject)? [Question ID = 10087]

1. BLASTn [Option ID = 40345]
2. BLASTx [Option ID = 40346]
3. tBLASTn [Option ID = 40347]
4. BLASTp [Option ID = 40348]

