A

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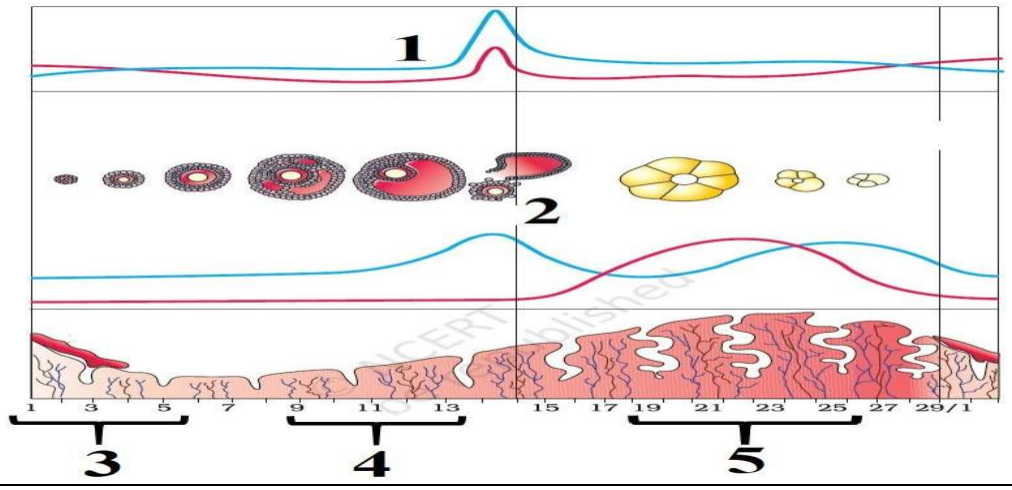
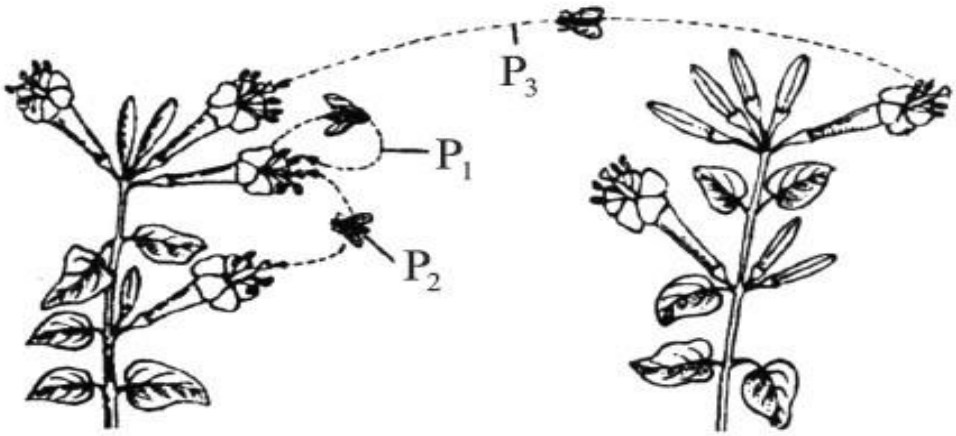
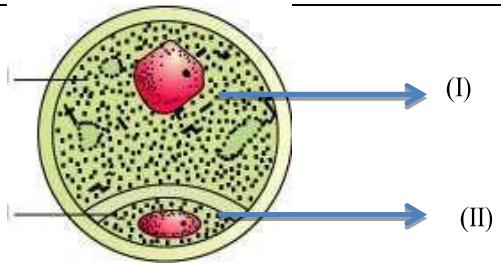
CLASS XII
BIOLOGY (044)

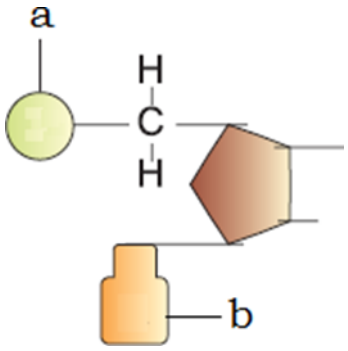
Time: 90 Minutes **Max: Marks: 35**

General Instructions:

1. **The Question Paper contains three sections.**
2. **Each question carries 0.70 marks.**
3. **Section A has 24 questions. Attempt any 20 questions.**
4. **Section B has 24 questions. Attempt any 20 questions.**
5. **Section C has 12 questions. Attempt any 10 questions.**
6. **All questions carry equal marks.**
7. **There is no negative marking.**

	SECTION - A Section – A consists of 24 questions (Sl. No.1 to 24). Attempt any 20 questions from this section. The first attempted 20 questions would be evaluated.
1.	An organic substance that can withstand environmental extremes and cannot be degraded by any enzyme is (a) Cuticle (b) Sporopollenin (c) Lignin (d) Cellulose.
2.	In water hyacinth and water lily, pollination takes place by (a) insects or wind (b) water currents only (c) wind and water (d) insects and water.
3.	The figure given below shows the various events occurring during a menstrual cycle with few events marked as 1, 2, 3, 4 and 5. Which of the following options shows the correct events? 

	(a) 1 – LH, 2 – Ovulation, 3 – Menstruation, 4 – Proliferative phase, 5 – Luteal phase (b) 1 – FSH, 2 – Implantation, 3 – Follicular Phase, 4 – Menstruation phase, 5 – Luteal phase (c) 1 – Estrogen, 2 – Parturition, 3 – Luteal Phase, 4 – Menstruation phase, 5 – Follicular phase (d) 1 – Progesterone, 2 – Fertilisation, 3 – Menstruation, 4 – Secretory phase, 5 – Luteal phase
4.	Layers of an ovum from outside to inside is A. corona radiata, zona pellucida and vitelline membrane. B. Zona pellucida, corona radiata and vitelline membrane. C. Vitelline membrane, zona pellucida and corona radiata. D, Zona pellucida, vitelline membrane and corona radiata.
5.	The given diagram shows 2 plants of the same species. Identify the types of pollination indicated as P1, P2 and P3 respectively.  (a) Allogamy, Chasmogamy, Cleistogamy (b) Autogamy, Xenogamy, Geitonogamy (c) Autogamy, Geitonogamy, Xenogamy (d) Geitonogamy, Allogamy, and Autogamy
6.	A marriage between normal visioned man and colour-blind woman will produce which of the following types of off springs? A. Normal sons and carrier daughters B. Colour-blind sons and carrier daughters C. Colour-blind sons and 50% carrier daughters D. 50% colour blind sons and 50% carrier daughters
7.	 Statements:

	(a) (I) is Generative cell, (II) is Vegetative cell (b) (I) is Vegetative cell, (II) is Generative cell (c) Generative cell produces 2 Male Gamete (d) Vegetative cell produces 2 Male Gamete Choose the correct: (a). a) & (c) (b). (b) & (c) (c). (a) & (d) (d). (b) & (d)
8.	Select the hormone-releasing Intra-Uterine Devices. (a) Lippes Loop, Multiload 375 (b) Vaults, LNG-20 (c) Multiload 375, Progestasert (d) Progestasert, LNG-20
9.	What is the correct sequence of sperm formation? (a) Spermatogonia, spermatozoa, spermatocytes, spermatids (b) Spermatogonia, spermatocytes, spermatids, spermatozoa (c) Spermatids, spermatocytes, spermatogonia, Spermatozoa (d) Spermatogonia, spermatocytes, spermatozoa, spermatids
10.	In a dihybrid cross between RRYY and rryy parents, the number of RrYy genotypes in F2 generation will be (a). 2 (b). 1 (c). 3 (d). 4
11.	In fowl , which parent is responsible to determine the sex of off-springs :? (a). Male parent (b). Female parent (c). Both parents (d). By environment conditions
12.	What are 'a' and 'b' in the nucleotide with purine represented below:  (A) Phosphate Adenine (B) Phosphate Guanine (C) Pentose Sugar Adenine (D) Phosphate Either Adenine or Guanine

13.	If the distance between two consecutive base pairs is 0.34 nm and the total number of base pairs of a DNA double helix in a typical mammalian cell is 6.6 × 109 bp, then the length of the DNA is approximately: (a) 2.0 meters (b) 2.5 meters (c) 2.2 meters (d) 2.7 meters.
14.	The function of copper ions in copper releasing IUDs is (a) they inhibit gametogenesis (b) they make uterus unsuitable for implantation (c) they inhibit ovulation (d) they suppress sperm motility and fertilising capacity of sperms.
15.	Which of the following rRNAs acts as structural RNA as well as ribozyme in bacteria? (a) 5S rRNA (b) 18S Rrna (c) 23S rRNA (d) 5.8S rRNA
16.	AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding of the transcribed mRNA? (a) AGGUAUCGCAU (b) UGGTUTCGCAT (c) ACCUAUGCGAU (d) UCCAUAGCGUA
17.	If the sequence of amino acid coded by an m-RNA is given , we can predict the sequence of nucleotides in the m-RNA . This show's which property the genetic code? A. Specificity B. Degeneracy C. Triplet nature D. Universal nature of genetic code
18.	Mendels law of independent assortment does not hold true for the genes that are located closely on (a). Same chromosome (b). Non homologous chromosome (c). X. Chromosome (d). Autosomes
19.	A female undergoing IVF treatment has blocked fallopian tubes. The technique by which the embryo with more than 8 blastomeres will be transferred into the female for further development is (a). ZIFT (b). GIFT (c) . IUT (d). AI
20.	Match the following RNA polymerase with their transcribed products: 1. RNA polymerase I (i) tRNA

	2.	RNA polymerase II	(ii)	rRNA
	3.	RNA polymerase III	(iii)	hnRNA

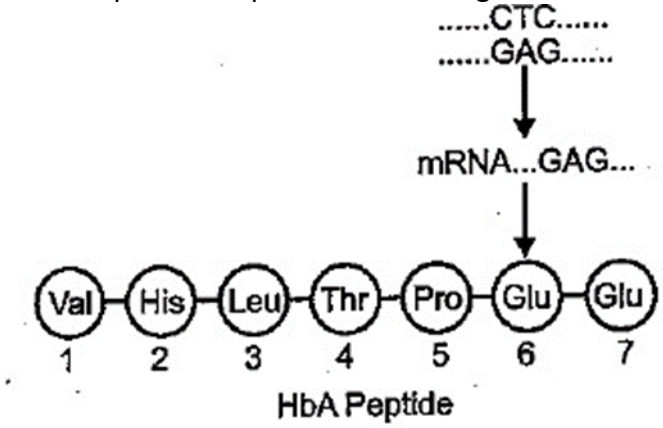
Select the correct option from the following:
(a) 1-i, 2-iii, 3-ii (b) 1-i, 2-ii, 3-iii
(c) 1-ii, 2-iii, 3-i (d) 1-iii, 2-ii, 3-i

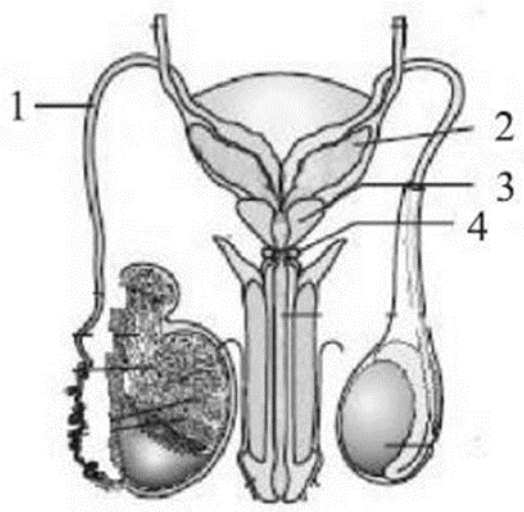
21.	When a single gene influences more than one trait it is called (a) codominance (b) pleiotropy (c) polygenic (d) none of these.
22.	The classical example of point mutations a) Haemophilia b) Sickle cell anaemia c) Phenylketonuria d) Cystic fibrosis
23.	A molecule that can act as a genetic material must fulfil the traits given below, except (a) it should be able to express itself in the form of Mendelian characters' (b) it should be able to generate its replica (c) it should be unstable structurally and chemically (d) it should provide the scope for slow changes that are required for evolution.
24.	Meiotic division of the secondary oocyte is completed (a) prior to ovulation (b) at the time of copulation (c) after zygote formation (d) at the time of fusion of a sperm with an ovum.

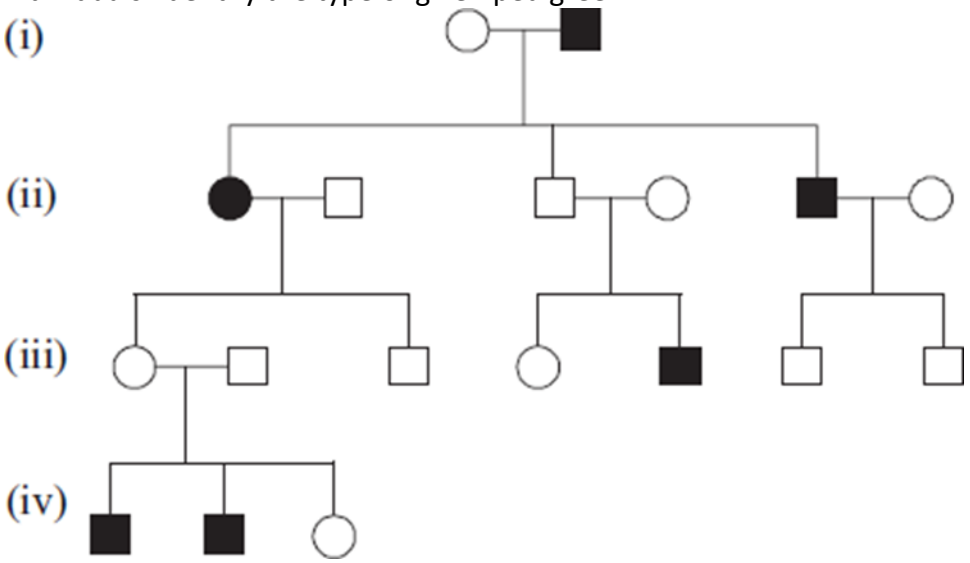
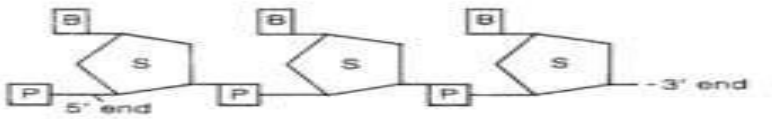
SECTION - B

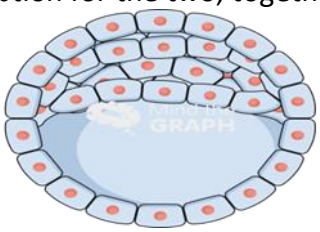
Section - B consists of 24 questions (Sl. No.25 to 48). Attempt any 20 questions from this section. <u>The first attempted 20 questions would be evaluated</u>.

	Question No. 25 to 28 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a). Both A and R are true and R is the correct explanation of A (b). Both A and R are true and R is not the correct explanation of A (c). A is true but R is false (d) A is False but R is true
25.	**Assertion:** Chasmogamous flowers require pollinating agents. **Reason:** Cleistogamous flowers do not expose their sex organs.
26.	**Assertion:** An example of false fruit is mango. **Reason:** The thalamus also contributes to fruit formation in false fruits.

27.	**Assertion:** Phenylketonuria is a recessive hereditary disease caused by body's failure to oxidize an amino acid phenylalanine to tyrosine, because of a defective enzyme. **Reason:** It results in the presence of phenylalanine acid in urine.
28.	**Assertion:** In human beings ovum is released from ovary at ootid stage **Reason:** The secondary oocyte divides into unequal daughter cells, a large ootid and a small polar body
29.	Generative cell was destroyed by laser but a normal pollen tube was still formed because: (a) Vegetative cell is not damaged. (b) Contents of killed generative cell stimulate pollen growth. (c) Laser beam stimulates growth of pollen tube. (d) The region of emergence of pollen tube is not harmed.
30.	Unisexuality of flowers prevents: (a) Geitonogamy but not xenogamy (b) Autogamy and geitonogamy (c) Autogamy but not geitonogamy (d) Both geitonogamy and xenogamy
31.	A relevant portion of β chain of haemoglobin of a normal human is as follows  The codon for the sixth amino acid is GAG. The sixth codon GAG changes to GAA as a result of mutation X and into GUG as a result of mutation Y. Which of the following is the incorrect statement? A. Mutation X causes no change in shape of red blood cells B. Mutation Y causes change in shape of red blood cells C. Both mutations X and Y causes change in shape of red blood cells D. Mutation Y does not cause change in shape of red blood cells
32.	Match the following genes of the Lac operon with their respective products. (A) i gene (i) b-galactosidase (B) z gene (ii) Permease (C) a gene (iii)Repressor (D) y gene (iv) Transacetylase Select the correct option. (A) (B) (C) (D) a) (iii) (iv) (i) (ii) b) (i) (iii) (ii) (iv)

	c) (iii) (i) (ii) (iv) d) (iii) (i) (iv) (ii)
33.	If an angiospermic male plant is diploid and female plant tetraploid, the ploidy level of endosperm will be: (a) Haploid (b) Triploid (c) Tetraploid (d) Pentaploid
34.	Select the correct match. (a) Haemophilia – Y linked (b) Phenylketonuria – Autosomal dominant trait (c) Sickle cell anaemia – Autosomal recessive trait (d) Thalassemia – X linked
35.	How many types of genotypes will be produced in the cross AaBb x AaBb ? (a). 2 (b). 9 (c). 8 (d). 4
36.	A male honey bee not has son because: A. The male gametes are not in proper number B. The male gametes are not used to make male off-springs C. The male gametes are yet to be in diploid chromosome number D. The female gamete develops into a male bee directly
37.	Given below is a diagrammatic sketch of a portion of human male reproductive system. Select the correct set of the names of the parts marked as 1 to 4 respectively.  (a) 1 – Ureter; 2 – Seminal Vesicle; 3 – Prostate; 4 – Bulbourethral Gland (b) 1 – Ureter; 2 – Prostate; 3 – Seminal Vesicle; 4 – Bulbourethral Gland (c) 1 – Vas deferens; 2 – Seminal Vesicle; 3 – Prostate; 4 – Bulbourethral Gland (d) 1 – Vas deferens; 2 – Seminal Vesicle; 3 – Bulbourethral Gland; 4 – Prostate

38.	In DNA double helix , a purine base always paired through hydrogen bonds with pyrimidine base to ensure : A. the antiparallel nature B. the semiconservative nature C. uniform width throughout DNA D. uniform length in a DNA
39.	In the following human pedigree, the filled symbols represent the affected individuals. Identify the type of given pedigree.  (a) Autosomal recessive (b) X-linked dominant (c) Autosomal dominant (d) X-linked recessive
40.	Which among the following does not confer stability to the helical structure of DNA? A. Phosphodiester bond B. H-bond C. N-glycosidic linkage D. All of these
41.	256 microspores will be formed by: (a). 512 microspore mother cells (b). 128 microspore mother cells (c). 64 microspore mother cells (d). 48 microspore mother cells
42.	 Fig. 257 **Polynucleotide chain.** General structure. P = phosphate, S = ribose or deoxyribose sugar, B = one of four bases. In DNA strand, the nucleotides are linked together by (a). Glycosidic bonds (b) Phosphodiester bonds

	(c). Peptide bonds (d). Hydrogen bonds.
43.	The three codons which result in the termination of polypeptide chain synthesis are (a) UAA, UAG, GUA (b) UAA, UAG, UGA (c) UAA, UGA, UUA (d) UGU,UAG,UGA
44.	Following statements are given regarding MTP. Choose the correct option given below: i) MTPs are generally advised during first trimester ii) MTPs are used as a contraceptive method iii) MTPs are always surgical iv) MTPs require the assistance of qualified medical professionals A. ii and iii B. i and iii C. i and iv D. i and ii
45.	If a haemophilic woman marries a normal man, (a) all their children will be normal. (b) all their sons will be haemophilic. (c) all their daughters will be haemophilic. (d) 50% sons and 50% daughters will be haemophilic
46.	Identify the human developmental stage shown as well as the related right place of its occurrence in a normal pregnant woman and select the right option for the two, together.  DEVELOPMENTAL STAGE / SITE OF OCCUIRENCE (a) Late morula — Middle part of fallopian tube (b) Blastula — End part of fallopian tube (c) Blastocyst — Uterine wall (d) 8 celled morula — Starting point of fallopian tube
47.	Gynaecomastia is a common feature seen in: a) Down's syndrome b) Turner's syndrome c) Cystic fibrosis d) Klinefelter's syndrome
48.	If the base sequence of a codon in mRNA is 5' – AUG – 3' the sequence of tRNA pairing with it must be (a) 5' – UAC – 3'

	(b) 5’ – CAU – 3’ (c) 5’-AUG – 3’ (d) 5’ – GUA – 3’

SECTION - C

Section-C consists of one case followed by 6 questions linked to this case (Q.No.49 to 54). Besides this, 6 more questions are given. Attempt any 10 questions in this section. The first attempted 10 questions would be evaluated.

Case: The process of translation required transfer of genetic information from a polymer of nucleotides to synthesise polymer of amino acids. The relationship between the sequence of amino acids in a polypeptide and nucleotide sequence of DNA or mRNA is called genetic code. George Gamow suggested that in order to code for all the amino acids, code should be made up of three nucleotides.

49. What is a codon?
(a) A length of DNA which codes for a particular protein.
(b) A part of the tRNA molecule to which a specific amino acid is attached.
(c) A part of the tRNA molecule which recognizes the triplet code on the mRNA.
(d) A part of the mRNA molecule that has a sequence of bases coding for an amino acid.

50. Three consecutive bases in the DNA molecule provide the code for each amino acid in a protein molecule. What is the maximum number of different triplets that could occur?
(a) 16
(b) 20
(c) 24
(d) 64

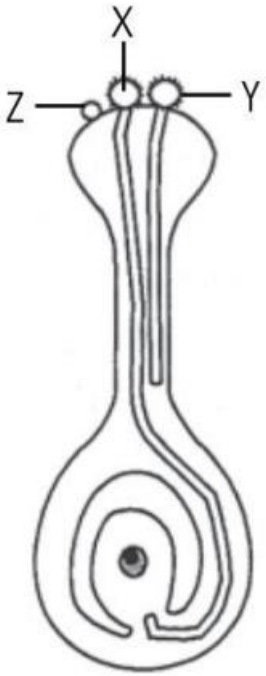
51. Listed below are some amino acids and their corresponding m RNA triplets.

Amino acid	mRNA triplet
Phenylalanine	UUU
Lysine	AAG
Arginine	CGA
Alanine	GCA

Which DNA sequence would be needed to produce the following polypeptide sequence?
Alanine – Arginine – Lysine – Phenylalanine

(a) CGT GCT TTC AAA
(b) CGT GCT TTC TTT
(c) CGU GCU UUC AAA
(d) CGU GCU UUC TTT

52. Identify the start codon among the following:
(a) AUG
(b) GUC

	(c) UAA (d) UGCA-
53.	Select the mismatched pair: (a). Initiation codon in some eukaryotes – GUG (b). Stop codon- UAG (c). Methionine – AUG (d). Anticodons – m RNA
54.	What would happen if a gene encoding a polypeptide of 50 amino acids, 25th codon UAU is mutated to UAA? (a). A polypeptide of 24 amino acids will be formed. (b). 2 polypeptides of 24 and 25 amino acids will be formed. (c). A polypeptide of 49 amino acids will be formed. (d). A polypeptide of 25 amino acids will be formed.
Case	Cross pollination is transfer of pollen grains to the anther of one flower to the stigma of a genetically different flower. It is performed with the help of an external agency which may be abiotic (eg. wind, water) or biotic (eg. Insects, Birds, Snails and Bats). The diagram shows carpel of an insect pollinated flower. 
55.	What is the most likely reason for non- germination of pollen grain Z? (a). Pollen grains X and Y were brought to the stigma earlier, therefore their germination inhibited the germination of pollen grain Z. (b). Pollen grain Z was brought to the flower by the wind, while pollen grains X and Y were brought to the flower by insect. (c). Pollen grain Z lacks protrusions that allow it to adhere properly onto the stigma surface. (d). Pollen grain Z comes from a flower of an incompatible species.
56.	Which of the following best describe the function of pollen tube? (a). It acts as a conduit to transport male gametes from anther to ovule.

	(b). It acts as a conduit to transport male gametes from stigma to the ovule. (c). It contains key nutrients that serve to nourish the newly- formed zygote. (d). It digests the tissues of stigma, style and ovary.
57.	Pollination of a flower in which the pollen is carried by an insect is called (a). Anemophily (b). Ornithophily (c). Entomophily (d). Malacophily
58.	Refer to the given characteristics of some flowers. (a). The stamens hang out of the flower, exposing the anthers to the wind. (b). The pollen grains are tiny and light. (c). The flower has a sweet scent. (d). The flower petals are brightly coloured. Which of the above are the characteristics of an insect pollinated flower? (a). a and b (b). b and c (c). a and c (d). c and d
59.	Pollenkitt is generally found in (a). Anemophilous flowers (b). Entomophilous flowers (c). Ornithophilous flowers (d). Malacophilous flowers.
60.	Even in the absence of pollinating agents seed- setting is assured in (a). Commelina (b). Zostera (c). Salvia (d). Fig