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**Subject: Biology**

**Topic: Principles of Inheritance & Variation**

**M.M. 360 COMPETITIVE TEST**  **Time: 60 Min.**

1. If ‘A’ represent the dominant allele and ‘a’ represents its recessive allele, which of the following would be the most likely result in the first generation offspring when Aa is crossed with aa?

|  |  |
| --- | --- |
| a) All will exhibit dominant phenotype | b) All will be recessive type |
| c) Dominant and recessive phenotype will be 50 % | d) Dominant phenotype will be 75 % |

1. A dihybrid cross between homozygous round yellow (RRYY) and wrinkled green (rryy) seed varieties of pea was traced through two generations. The possibility of genotype RRyy in F2 generation should be as :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1/16 | b) 2/16 | c) 3/16 | d) 9/16 |

1. Recessive genes can express in :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Homozygous condition | b) Heterozygous condition | c) Both (a) & (b) | d) None of these |

1. When a heterozygous round seeded plant is crossed with recessive wrinkled seeded plant, the round and wrinkled phenotype will appear in F1 in the ratio :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 : 2 | b) 2 : 1 | c) 1 : 1 | d) 3 : 1 |

1. Phenotypic ratio of monohybrid test cross is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 :1 | b) 3 : 1 | c) 1 : 2 : 1 | d) 2 : 1 |

1. A pea plant with genotype TTRrYy will produce gametes of how many types :

|  |  |  |  |
| --- | --- | --- | --- |
| a) eight | b) six | c) three | d) four |

1. In F2 the phenotypic ratio of dihybrid cross is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 : 1 : 1 : 1 | b) 3 : 1 | c) 9 : 3 : 3 : 1 | d) 9 : 3 : 4 |

1. Mendel’s law of independent assortment is applicable for :

|  |  |  |  |
| --- | --- | --- | --- |
| a) All genes in all organism | b) All genes of pea plant only | c) All linked genes only | d) all non-linked genes |

1. In dihybrid crosses, the F1 heterozygous plants are self-fertilized to produce an F2 generation and if offsprings are computed in Punnett square the phenotypic F2 generation as per Mendel’s independent assortment will yield.

|  |  |  |  |
| --- | --- | --- | --- |
| a) 9 : 7 | b) 9 : 3 : 3 : 1 | c) 9 : 6 : 1 | d) 12 : 3 : 1 |

1. In his experiment with pea plants, Mendel performed test crosses between :

|  |  |
| --- | --- |
| a) F1 hybrid and dominant parents | b) F1 hybrid and F1 hybrid |
| c) F1 hybrid and recessive parents | d) Dominant parent and recessive parent |

1. A dihybrid for qualitative trait is crossed with homozygous recessive individuals of its type, the phenotypic ratio is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 : 2 : 1 | b) 3 : 1 | c) 1 : 1 : 1 : 1 | d) 9 : 3 : 3 : 1 |

1. Right handedness is dominant over left handedness. Most probable gene type with 2 right handed parents having left handed child is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) RR X rr | b) Rr X RR | c) RR x Rr | d) Rr X Rr |

1. G. Mendel use the plant

|  |  |  |  |
| --- | --- | --- | --- |
| a) Oenothera lamarkiana | b) Lathyrus sativus | c) Mirabilis Jalapa | d) Pisum Sativum |

1. An organism with two identical alleles is called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Dominant | b) Hybrid | c) heterozygous | d) homozygous |

1. The term gene was introduced by :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Mendel | b) Johannsen | c) Morgan | d) Bateson |

1. Who among the following was proposed chromosomal theory of inheritance :

|  |  |  |  |
| --- | --- | --- | --- |
| a) T.H.Morgan | b) Johannsen | c) Sutton and Boveri | d) Beadle and Tatum |

1. A is the father of experimental genetics selected B as experimental material :

|  |  |
| --- | --- |
| a) A – William Bateson ; B – Mirabilis Jalapa | b) A – George John Mendel ; B – Pisum sativum |
| c) A – Thomas Hunt Morgan ; B – Drosophila Melanogaster | d) A – William Bateson ; B – Oenothera Lamarckian |

1. According to chromosomal theory of inheritance, chromosome segregate and assort independently during A and recombine at the time of B.

|  |  |
| --- | --- |
| a) A – Meiosis ; B – Fertilization | b) A – Mitosis ; B – Fertilization |
| c) A – Meiosis ; B – Sporogenesis | d) A – Meiosis ; B – Gametogenesis |

1. Genes regulating many phenotypic characters are called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Complementary gene | b) polygenic trait | c) pleiotropic gene | d) Multiple allele |

1. When red and white flowered Mirabilis Jalapa plant are crossed all pink flowered are seen in F1 generation. When F1 progeny is selfed then the expected phenotypic and genotypic ratios are :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 : 2 : 1 and 3 : 1 : 1 | b) 3 : 1 and 1 : 2 : 1 | c) 1 : 2 : 1 and 1 : 2 : 1 | d) 1 : 1 and 1 : 1 : 1 |

1. A gene having many effects/gene controlling more than one character is called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Supplementary gene | b) Complementary gene | c) Epistatic gene | d) Pleiotropic gene |

1. The F2 dihybrid ratio 12 : 3 : 1 is explained on the basis of :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Epistatic interaction | b) Complementary gene | c) Interaction of 2 allele | d) Both (a) & (b) |

1. Phenotypic and genotypic ratio is similar in case of :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Complete dominance | b) Incomplete dominance | c) Over dominance | d) Epistasis |

1. The ABO blood grouping in human beings is an example of

|  |  |  |  |
| --- | --- | --- | --- |
| i) dominance | ii) Incomplete dominance | iii) Co-dominance | iv) multiple alleles |
| a) (i) & (ii) | b) (ii) , (iii) & (iv) | c) (i) , (iii) & (iv) | d) (i) , (iii) & (ii) |

1. Two plants one with black flower and other with white coloured flower were crossed in an experiment. In the next generation grey coloured flowers were obtained. The reason for the result is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Incomplete dominance | b) pseudo dominance | c) Co dominance | d) none of above |

1. Multiple allelism is observed in :

|  |  |
| --- | --- |
| a) Flower colour in snapdragon | b) Pod colour in Pisum sativum |
| c) Haemophilia in man | d) ABO blood type |

1. If in drosophila, red and white eye colour are sex linked characters, in which chromosome are the sex linked characters located?

|  |  |
| --- | --- |
| a) X chromosome | b) Y chromosome |
| c) Both X and Y chromosome | d) Both X and Y chromosome of the male |

1. When a red eyed homozygous female drosophila is crossed with a white eyed male, the phenotype of progeny in the F1 generation will be :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 red , 2 pink , 2 white eyed | b) 3 red , 1white eyed | c) All red eyed | d) all white eyed |

1. Human contains \_\_\_\_\_\_ of chromosome :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 23 number | b) 23 pairs | c) 22 number | d) 22 pairs |

1. Number of autosomes in human sex cells is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 22 | b) 12 | c) 44 | d) 23 |

1. Percentage of recombination between A & B is 9 % , A & C is 17 % , B & C is 26 % then the arrangement of genes is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) ABC | b) ACB | c) BCA | d) BAC |

1. In humans sex determination the key factor is

|  |  |  |  |
| --- | --- | --- | --- |
| a) Y chromosome | b) X chromosome | c) Both (a) & (b) | d) None of above |

1. In certain cell, genetic recombination can occur during :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Meiosis | b) amitosis | c) Mitosis | d) Both (a) and (c) |

1. Balance theory of sex determination was proposed by :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Calvin Bridges | b) strass burger | c) T.H.Morgan | d) Waldeyer |

1. Crossing over in diploid organism is responsible for :

|  |  |
| --- | --- |
| a) Segregation of alleles | b) Recombination of linked alleles |
| c) Dominance of genes | d) Linkage between genes |

1. Barr bodies in mammals represents :

|  |  |
| --- | --- |
| a) All the heterochromatin in male and female cells | b) The Y chromosome in somatic cells of male |
| c) All the heterochromatin in female cells | d) One of the two X chromosome in somatic cells of females |

1. When a cluster of genes show linkage behavior they :

|  |  |
| --- | --- |
| a) Do not show a recombination map | b) Show recombination during meiosis |
| c) Do not show independent assortment | d) Induce cell division |

1. Barr body is associated with :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Autosomes | b) male sex only | c) X chromosome | d) Y chromosome |

1. Variation in characters are brought about by :

|  |  |
| --- | --- |
| a) Duplication of chromosome during mitosis | b) Mutations |
| c) crossing over during meiosis | d) Both (a) and (b) |

1. Mutation at the chromosomal level, with an addition of individual chromosome is referred to as :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Polyploidy | b) Trisomy | c) Structural mutation | d) Point mutation |

1. A pair of genes are linked if their recombination frequency in test cross is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) lower than 50 % | b) More than 50 % | c) 75 % | d) 100 % |

1. Pentasomic can be denoted by :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 2n + 2 | b) 2n + 3 | c) 2n + 1 | d) 2n + 4 |

1. Cell carry mutate gene is called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) cistron | b) mutant | c) Muton | d) recon |

1. Any physical or chemical agent that promotes the occurrence of mutation is called

|  |  |  |  |
| --- | --- | --- | --- |
| a) mutagen | b) carcinogen | c) Both (a) & (b) | d) None of these |

1. How many different type of gametes can an organism of genotypes AaBBCc produce?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3 | b) 4 | c) 9 | d) 16 |

1. Cross between AaBB and aaBB will form :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1 AaBB : 1 aaBB | b) All AaBB | c) 3 AaBB : 1 aaBB | d) 1 AaBB : 3 aaBB |

1. The most striking example of point mutation is found in a diseases called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Down syndrome | b) Sickle cell anaemia | c) Thalassemia | d) Night blindness |

1. If the DNA codons are ATG ATG ATG and a cytosine base is inserted at the beginning, then which of the following will result :

|  |  |  |  |
| --- | --- | --- | --- |
| a) CAT GAT GATG | b) A non-sense mutation | c) C ATG ATG ATG | d) CA TGA TGA TG |

1. Mendel’s law applicable only when :

|  |  |
| --- | --- |
| a) F1 monohybrid cross show two types of individuals | b) The characters are linked |
| c) Parents are pure- breeding | d) Ist pair of contrasting trait is dependent upon other pairs |

1. The formation of multivalent at meiosis in diploid organism is due to :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Deletion | b) Reciprocal translocation | c) Monosomy | d) Inversion |

1. Which of the following is the main category of mutation :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Somatic mutation | b) genetic mutation | c) heterosis | d) None of these |

1. Monosomy and trisomy are respectively :

|  |  |  |  |
| --- | --- | --- | --- |
| a) n – 1 ; n + 2 | b) 2n + 2 ; 2n + 1 | c) 2n – 1 ; 2n + 1 | d) n – 2 ; 2n + 1 |

1. Mongolism or Down’s syndrome occurs when the patients have :

|  |  |
| --- | --- |
| a) 45 chromosome instead of 46 | b) 47 chromosome instead of 46 |
| c) 23rd chromosome in three doses | d) Non-disjunction of 21st chromosome |

1. Klinefelter’s syndrome is caused :

|  |  |
| --- | --- |
| a) In females lacking one X chromosome | b) In females having extra X chromosome |
| c) In males having extra Y chromosome | d) In females having extra Y chromosome |

1. An abnormal human male phenotype involving an extra X chromosome (XXY) is :

|  |  |
| --- | --- |
| a) Cause of intersex | b) Cause of Edward syndrome |
| c) Cause of Down syndrome | d) Cause of Klinefelter’s syndrome |

1. Down syndrome is cased due to an extra chromosome is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 12th chromosome | b) 21st chromosome | c) sex chromosome | d) 2nd chromosome |

1. Sickle cell anemia is a \_\_\_\_\_\_\_\_\_\_\_\_\_ diseases.

|  |  |  |  |
| --- | --- | --- | --- |
| a) Hereditary | b) Physiological | c) Pathogenic | d) Deficiency |

1. Which of the following is a sex linked diseases :

|  |  |  |  |
| --- | --- | --- | --- |
| a) colour blindness | b) rickets | c) Diphtheria | d) Beri beri |

1. Red green colour blindness in man is a

|  |  |  |  |
| --- | --- | --- | --- |
| a) Sex linked character | b) Sex limited character | c) Sexual character | d) None of above |

1. Which of the following is not correct match ?

|  |  |
| --- | --- |
| a) Sex determination – A chromosome phenomenon | b) Y chromosome – Autosomal |
| c) red green colour blindness – A sex linked character | d) An abnormal chromosome number – case of polyploidy |

1. Frequency of Down syndrome increases when the maternal age is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Above 35 years | b) Below 35 years | c) during Ist pregnancy | d) Mother having 3 child |

1. In which of the following conditions can the female progeny be colour blind?

|  |  |
| --- | --- |
| a) Father colour blind , mother carrier | b) Father colour blind , mother normal |
| c) Both normal | d) Father normal , mother carrier |

1. Edward’s , Patau’s and down syndrome are :

|  |  |
| --- | --- |
| a) Change in autosomes | b) change in sex chromosome |
| c) Mutation due to malnutrition | d) Both changes in sex chromosome and autosomes |

1. Syndrome in human in which an individual somatic cell contain only one sex chromosome XO is called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Down’s syndrome | b) Klinefelter’s syndrome | c) Patau’s syndrome | d) Turner’s syndrome |

1. Anil is colour blind. What is the chance of his son inheriting colour blindness from him?

|  |  |  |  |
| --- | --- | --- | --- |
| a) 0 % | b) 50 % | c) 100 % | d) None of these |

1. Of a normal couple, half the sons are haemophilic while half the daughters are carriers. The gene is located on :

|  |  |
| --- | --- |
| a) X chromosome of father | b) Y chromosome of father |
| c) One X chromosome of mother | d) Both X chromosome of mother |

1. Of both normal parents, the chance of a male child becoming colour blind are :

a) Not possible

b) Possible only when all the four grand parents had normal vision.

c) Possible only when father’s mother was colour blind

d) Possible only when mother’s father was colour blind

1. Haemophilic is more common in males because it is a

|  |  |
| --- | --- |
| a) Recessive character carried by Y chromosome | b) Dominant character carried by Y chromosome |
| c) Dominant character carried by X chromosome | d) Recessive character carried by X chromosome |

1. Haemophilic man marries a normal woman. Their offsprings will be :

|  |  |
| --- | --- |
| a) All are haemophilic | b) All boys are haemophilic |
| c) All girls are haemophilic | d) all boys are normal |

1. A diseases man marries a normal woman. They get three daughters and five sons. All the daughters were diseased and sons were normal. The gene of this diseases is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Sex linked dominant | b) Sex linked recessive | c) Sex limited character | d) Autosomal dominant |

1. If father shows normal genotype and mother shows carrier trait for haemophilic trait for hemophilia :

|  |  |
| --- | --- |
| a) Female offspring has probability of 50% to have disease | b) All the female offsprings will be normal |
| c) All the female offsprings will be carriers | d) Male offspring has probability of 50% to have disease |

1. Which one of the following conditions in humans is correctly matched with its chromosomal abnormality/linkage?

|  |  |
| --- | --- |
| a) Klinefelter’s syndrome = 44 + XXY | b) Colour blindness = Y linked |
| c) Erythroblastosis = X linked | d) Down syndrome = 44 + XO |

1. Female AaBb is crossed to male AAbb, their gametes shall be :

|  |  |
| --- | --- |
| a) Female = AB , ab ; Male = AA , bb | b) Female = Aa , Bb ; Male = AA , bb |
| c) Female = AB , Ab , aB , ab ; Male = Ab | d) Female = AA , bb , AB , aB ; Male = Ab |

1. Percentage of heterozygous individuals obtained from selfing of rr individuals shall be :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 100 % | b) 75 % | c) 50 % | d) 25 % |

1. Mendel’s law of independent assortment deduced from :

|  |  |  |  |
| --- | --- | --- | --- |
| a) test cross | b) Back cross | c) monohybrid cross | d) Dihybrid cross |

1. Which one is exception of Mendel’s principle of dominance:

|  |  |  |  |
| --- | --- | --- | --- |
| a) Wild pea | b) Mirabilis/Antirrhinum | c) garden pea | d) Maize |

1. Which is dominant trait in pea:

|  |  |  |  |
| --- | --- | --- | --- |
| a) pod colour = yellow | b) Seed colour = white | c) flower position = Axillary | d) Plant height = dwarf |

1. Heterozygous red flowered plant is crossed with homozygous red flowered plant. Number of white flowered plant would be

|  |  |  |  |
| --- | --- | --- | --- |
| a) zero | b) one | c) two | d) three |

1. ABO blood grouping is determined by three alleles. Possible genotypes and phenotypes are :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 3 , 1 | b) 4 , 6 | c) 6 , 4 | d) 9 , 7 |

1. When both alleles shows their effect together on being present together, the phenomenon is called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) dominance | b) Codominance | c) Pseudo dominance | d) Amphidominance |

1. Two crosses in which the source of gametes are reversed are called :

|  |  |  |  |
| --- | --- | --- | --- |
| a) test cross | b) reverse cross | c) Dihybrid cross | d) reciprocal cross |

1. Which one form these given below is the period for Mendel’s hybridisation experiments.

|  |  |  |  |
| --- | --- | --- | --- |
| a) 1856 – 1863 | b) 1840 – 1850 | c) 1857 – 1869 | d) 1870 – 1877 |

1. In maize, chromosome number is 2n = 20. The number of linkage group in it will be :

|  |  |  |  |
| --- | --- | --- | --- |
| a) 20 | b) 40 | c) 10 | d) 5 |

1. Linkage was first observed in :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Field pea | b) sweet pea | c) Pea | d) grass pea |

1. Greater is the distance between the two genes on a chromosome :

|  |  |
| --- | --- |
| a) greater is the linkage strength | b) lesser is the linkage strength |
| c) Linkage strength remains unchanged | d) There is no relationship between the two |

1. Which of the following allele will produce pattern baldness in female :

|  |  |  |  |
| --- | --- | --- | --- |
| a) BB | b) Bb | c) bb | d) both (a) & (b) |

1. Red-green colour blindness is :

|  |  |  |  |
| --- | --- | --- | --- |
| a) protonopia | b) Deuteronopia | c) tritonopia | d) None |

1. If father transfer a trait to a grandson via daughter, it is called as :

|  |  |  |  |
| --- | --- | --- | --- |
| a) Digyanic | b) Diandric | c) criss cross | d) Both (a) & (c) |

1. Select correct match (w.r.t dihybrid phenotypic ratio in F2 generation)

|  |  |
| --- | --- |
| a) recessive epistasis : 12 : 3 : 1 | b) Dominant epistasis : 9 : 3 : 4 |
| c) Supplementary gene : 12 : 3 : 1 | d) duplicate recessive genes : 9 : 7 |

1. Sex of drosophila having genotype 3A + 3X:

|  |  |  |  |
| --- | --- | --- | --- |
| a) triploid female | b) Diploid male | c) intersex | d) Super female |

**[Class =12th]**

**Answers**

|  |
| --- |
| 1. c |
| 1. a |
| 1. a |
| 1. c |
| 1. a |
| 1. d |
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