



Topic:- ZOO MPHIL S2

1) Which of the following disorders is NOT suitable for population carrier screening?

[Question ID = 1793]

1. Cystic fibrosis [Option ID = 7166]
2. Oculocutaneous albinism [Option ID = 7167]
3. Sickle cell disease [Option ID = 7168]
4. Tay-Sachs disease [Option ID = 7169]

Correct Answer :-

- Oculocutaneous albinism [Option ID = 7167]

2) Following statements that are related to role of Sxl and Tra proteins in the sex determination pathway of *D. melanogaster*, NOT all are correct.

- i. *sis* and *dpx* genes are expressed only in female embryos
- ii. Sxl early protein allows the expression of the Sxl late protein which in turn suppresses the default male specific splicing pattern in the pathway
- iii. Sxl late protein competes with U2AF bound to the proximal 3' splice site of intron 1 in the *tra* pre-mRNA so that the distal 3'splice site is used
- iv. The functional Tra protein in females prevents skipping of exon 4 of the *dsx* pre-mRNA

Which of the following combinations is correct set of statements?

[Question ID = 1794]

1. i, ii and iv  
[Option ID = 7170]
2. ii, iii, iv  
[Option ID = 7171]
3. ii and iii only  
[Option ID = 7172]
4. iii and iv only  
[Option ID = 7173]

Correct Answer :-

- ii, iii, iv  
[Option ID = 7171]

3) Which chemical is injected in *Xenopus* male and female for artificially inducing gametogenesis in them?

[Question ID = 1795]

1. Testosterone  
[Option ID = 7174]
2. Estrogen  
[Option ID = 7175]
3. Human chorionic gonadotropin  
[Option ID = 7176]
4. Prolactin  
[Option ID = 7177]

Correct Answer :-

- Human chorionic gonadotropin  
[Option ID = 7176]

4) Match the structure given in List A with the characteristics given in List B below

List A	List B
A. Zona pellucida	1. Golgi derived; membrane bound.
B. Cortex	2. Homologous to acrosomal vesicle.
C. Cortical granule	3. Extracellular envelope, thick matrix.



Correct set of options are:

[Question ID = 1796]

1. A - 1, 3

[Option ID = 7178]

2. B - 3, 4

[Option ID = 7179]

3. C - 1, 2

[Option ID = 7180]

4. D - 2, 3

[Option ID = 7181]

Correct Answer :-

• C - 1, 2

[Option ID = 7180]

5) Eukaryotic diversification took place during which geologic period?

[Question ID = 1797]

1. Cambrian [Option ID = 7182]

2. Carboniferous [Option ID = 7183]

3. Devonian [Option ID = 7184]

4. Paleozoic [Option ID = 7185]

Correct Answer :-

• Cambrian [Option ID = 7182]

6) The major cause of evolution of genes and proteins is:

[Question ID = 1798]

1. Point mutation [Option ID = 7186]

2. Sexual reproduction and recombination [Option ID = 7187]

3. Frame shift mutations [Option ID = 7188]

4. Gene duplication and divergence [Option ID = 7189]

Correct Answer :-

• Gene duplication and divergence [Option ID = 7189]

7) Which type of the survivorship curve is suitable for the organisms who breed several times during the course of their life span?

[Question ID = 1799]

1. Type I [Option ID = 7190]

2. Type II [Option ID = 7191]

3. Type III [Option ID = 7192]

4. Type IV [Option ID = 7193]

Correct Answer :-

• Type I [Option ID = 7190]

8) Which of the following best describes an ecological race?

[Question ID = 1800]

1. A locally adapted population with distinct features [Option ID = 7194]

2. A population that is fertile with other population [Option ID = 7195]

3. A species with more than one polymorphism [Option ID = 7196]

4. A morphological polymorphism maintained by ecological factors [Option ID = 7197]

Correct Answer :-

• A locally adapted population with distinct features [Option ID = 7194]

9) Identify correct pair of swimming style and the thrust generation in fishes:

[Question ID = 1801]

1. Body waves: (Sub) Carangiform [Option ID = 7198]

2. Partial body waves: Anguilliform [Option ID = 7199]

3. Caudal peduncle/fin beats: Ostraciform [Option ID = 7200]

4. Pectoral fin beats: Amiiform [Option ID = 7201]

Correct Answer :-

• Caudal peduncle/fin beats: Ostraciform [Option ID = 7200]

10) The interaction in which an individual gives up or sacrifices some of its own reproductive potential to benefit another



4. Altruism [Option ID = 7205]
2. Territory [Option ID = 7203]
3. Hierarchy [Option ID = 7204]

Correct Answer :-

- Altruism [Option ID = 7205]

11) Which phrase best describes an instinctive behaviour?

[Question ID = 1803]

- Typically innate and relatively inflexible [Option ID = 7206]
- Generally learned, flexible, and cumulative [Option ID = 7207]
- Often occurs where mistakes are not costly [Option ID = 7208]
- Usually performed incorrectly for the first time [Option ID = 7209]

Correct Answer :-

- Typically innate and relatively inflexible [Option ID = 7206]

12) Melatonin is secreted at night, regardless of the habit of the animal, and exposure to light at night suppresses the melatonin levels. Which of the following statements is NOT TRUE?

[Question ID = 1804]

- Eyes are required for light-induced suppression of night melatonin [Option ID = 7210]
- Blue but not red light will suppress the night melatonin in a blind person [Option ID = 7211]
- Blind-folded normal and blind persons will show identical night melatonin suppression [Option ID = 7212]
- Both blue and white light will suppress the night melatonin in blind [Option ID = 7213]

Correct Answer :-

- Blind-folded normal and blind persons will show identical night melatonin suppression [Option ID = 7212]

13) The mechanism of signal transduction by steroid hormones DIFFER from amine and peptide hormones because

[Question ID = 1805]

- steroids use small, water soluble second messengers [Option ID = 7214]
- they bind with specific receptor proteins on target-cell plasma membranes [Option ID = 7215]
- they bind to cytoplasmic or nuclear receptors and affect gene expression [Option ID = 7216]
- they are secreted from exocrine glands [Option ID = 7217]

Correct Answer :-

- they bind to cytoplasmic or nuclear receptors and affect gene expression [Option ID = 7216]

14) Seasonally breeding species use information from environment to schedule their reproduction at a 'correct time' during the year. The transduction of the environmental message (EM) into an endocrine response in the brain involves:

[Question ID = 1806]

- EM → GnRH → GnIH → pre-optic area → adenohypophysis → gonads  
[Option ID = 7218]
- EM → pre-optic area → thyroid hormone responsive pathway → adenohypophysis  
→ gonads  
[Option ID = 7219]
- EM → thyroid hormone responsive pathway → pre-optic area → neurohypophysis → gonads  
[Option ID = 7220]
- EM → thyroid hormone responsive pathway → pre-optic area → adenohypophysis  
→ gonads  
[Option ID = 7221]

Correct Answer :-

- EM → thyroid hormone responsive pathway → pre-optic area → adenohypophysis  
→ gonads  
[Option ID = 7221]

15) Hypothalamic releasing hormones reach the anterior pituitary through

[Question ID = 1807]

- Lymphatic vessels [Option ID = 7222]
- Posterior pituitary gland [Option ID = 7223]
- Blood vessels [Option ID = 7224]
- Axons [Option ID = 7225]

Correct Answer :-



[Question ID = 1808]

1. Spindle shaped, unbranched, non-striated, uninucleate and involuntary [Option ID = 7226]  
2. Spindle shaped, unbranched, non-striated, multinucleate and involuntary [Option ID = 7227]  
3. Cylindrical, unbranched, striated, multinucleate and voluntary [Option ID = 7228]  
4. Cylindrical, unbranched, striated, uninucleate and voluntary [Option ID = 7229]

Correct Answer :-

- Spindle shaped, unbranched, non-striated, uninucleate and involuntary [Option ID = 7226]

17) Which of the following is most lethal human malarial parasite?

[Question ID = 1809]

1. *Plasmodium vivax*  
[Option ID = 7230]  
2. *Plasmodium malariae*  
[Option ID = 7231]  
3. *Plasmodium falciparum*  
[Option ID = 7232]  
4. *Plasmodium ovale*  
[Option ID = 7233]

Correct Answer :-

- *Plasmodium falciparum*  
[Option ID = 7232]

18) Marker used for identifying T-cell is

[Question ID = 1810]

1. CD4  
[Option ID = 7234]  
2. CD3  
[Option ID = 7235]  
3. TCR- $\alpha\beta$   
[Option ID = 7236]  
4. MHC II  
[Option ID = 7237]

Correct Answer :-

- CD3  
[Option ID = 7235]

19) Which of the following statements about cytokines synthesized by CD4<sup>+</sup> Th1 and Th2 subsets is INCORRECT?

[Question ID = 1811]

1. Cytokines produced by Th1 cells include IFN- $\gamma$  and TNF- $\beta$  [Option ID = 7238]  
2. Cytokines produced by Th2 cells are important in allergic responses [Option ID = 7239]  
3. Th1 cells secrete cytokines that induce macrophage and NK cell activation [Option ID = 7240]  
4. Th2 cells secrete cytokines that activate CD8<sup>+</sup> T cells [Option ID = 7241]

Correct Answer :-

- Th2 cells secrete cytokines that activate CD8<sup>+</sup> T cells [Option ID = 7241]

20) Dys-regulation of cyclin D-dependent kinases and resulting cancer induction can be caused by:

[Question ID = 1812]

1. Induction of p15 by TGF $\beta$   
[Option ID = 7242]  
2. Hypophosphorylation of Rb  
[Option ID = 7243]  
3. Infection with HPV and production of virally-coded E7  
~~[Option ID = 7244]~~  
4. Expression of p21  
[Option ID = 7245]



21) Ketone bodies are formed in:

[Question ID = 1813]

1. Mitochondria [Option ID = 7246]
2. Proteasome [Option ID = 7247]
3. Cytosol [Option ID = 7248]
4. Endoplasmic reticulum [Option ID = 7249]

Correct Answer :-

- Mitochondria [Option ID = 7246]

22) Acetylation of lysine in histones

[Question ID = 1814]

1. Reduces interaction between histone and DNA [Option ID = 7250]
2. Increases interaction between histone and DNA [Option ID = 7251]
3. Increases separation of two strands of DNA [Option ID = 7252]
4. Causes compaction of DNA [Option ID = 7253]

Correct Answer :-

- Reduces interaction between histone and DNA [Option ID = 7250]

23) Guanine Nucleotide Exchange Factor is responsible for:

[Question ID = 1815]

1. Replacing GDP with GTP in GTPases [Option ID = 7254]
2. Replacing GTP with GDP in GTPases [Option ID = 7255]
3. Converting GTP into ATP [Option ID = 7256]
4. Activate GTPase to hydrolyse protein bound GTP [Option ID = 7257]

Correct Answer :-

- Replacing GDP with GTP in GTPases [Option ID = 7254]

24) In cardiolipin deficient mitochondria,

[Question ID = 1816]

1. a steep pH gradient would be formed. [Option ID = 7258]
2. the electron transport chain (ETC) would continue to transport protons out of the matrix but ATP synthesis would decrease. [Option ID = 7259]
3. the  $F_0F_1$  complex would continue to synthesize ATP. [Option ID = 7260]
4. the required proton motive force would not be generated due to decrease in activity of the ETC. [Option ID = 7261]

Correct Answer :-

- the required proton motive force would not be generated due to decrease in activity of the ETC. [Option ID = 7261]

25) Lymphocytes do not express cadherins. E-cadherins were ectopically expressed in lymphocytes and equal number of these cells was cultured in medium containing high concentration of extracellular  $Ca^{2+}$ . What would you observe under the microscope?

[Question ID = 1817]

1. Single cells suspension of lymphocytes [Option ID = 7262]
2. Clumps of lymphocytes in single cell suspension [Option ID = 7263]
3. A single large aggregate of lymphocytes [Option ID = 7264]
4. A sheet of lymphocytes [Option ID = 7265]

Correct Answer :-

- Clumps of lymphocytes in single cell suspension [Option ID = 7263]

26) Which of the following plasma membrane receptors activate signaling pathways by forming molecular dimers that result in protein phosphorylation reactions upon binding of their specific ligand?

[Question ID = 1818]

1. Steroid hormone receptors [Option ID = 7266]
2. Receptor tyrosine kinases [Option ID = 7267]
3. Ligand-gated ion channels [Option ID = 7268]
4. G protein-coupled receptors [Option ID = 7269]

Correct Answer :-

- Receptor tyrosine kinases [Option ID = 7267]

27) What is the term used in next generation sequencing for denoting the average number of times a genomic segment is represented?

[Question ID = 1819]

1. Contig [Option ID = 7270]
2. Coverage [Option ID = 7271]
3. Prefinished sequence [Option ID = 7272]
4. Minimal tiling path [Option ID = 7273]





28) Which of the following is NOT TRUE for B-DNA?

[Question ID = 1820]

1. It is a right-handed double helical structure [Option ID = 7274]
2. The major and minor grooves alternate with each other [Option ID = 7275]
3. Conformation of  $\beta$ -deoxyribofuranose is 3'-endo [Option ID = 7276]
4. The conformation around N-glycosidic bond is anti [Option ID = 7277]

Correct Answer :-

- Conformation of  $\beta$ -deoxyribofuranose is 3'-endo [Option ID = 7276]

29) Which property of Taq DNA polymerase is utilized in the TA cloning technique?

[Question ID = 1821]

1. RNA Ligase [Option ID = 7278]
2. DNA Ligase [Option ID = 7279]
3. DNA dependant DNA Polymerase [Option ID = 7280]
4. Terminal Transferase [Option ID = 7281]

Correct Answer :-

- Terminal Transferase [Option ID = 7281]

30) Which of the following enzymes is used for cutting single stranded DNA?

[Question ID = 1822]

1. Terminal transferase [Option ID = 7282]
2. S1 Nuclease [Option ID = 7283]
3. Klenow fragment [Option ID = 7284]
4. Bal 31 [Option ID = 7285]

Correct Answer :-

- S1 Nuclease [Option ID = 7283]

31) The experiment done by Meselson and Stahl concluded that the DNA replicates semi-conservatively by exploiting some of the following combination of techniques.

- i. Growth of *E. coli* in relatively defined synthetic medium.
- ii. Use of radiolabelled nitrogen, and analysis differentially labeled DNA by autoradiography.
- iii. Use of heavy nitrogen, and separation of differentially labeled by equilibrium density gradient centrifugation.

Select the option representing correct combination of techniques.

[Question ID = 1823]

1. (i), (ii), and (iii)  
[Option ID = 7286]
2. (i) and (ii)  
[Option ID = 7287]
3. (i) and (iii)  
[Option ID = 7290]
4. (ii) and (iii)  
[Option ID = 7293]

Correct Answer :-

- (i) and (iii)  
[Option ID = 7290]

32) Which technique among following cannot be used to isolate exosomes?

[Question ID = 1826]

1. Immunoprecipitation [Option ID = 7298]
2. Ultracentrifugation [Option ID = 7299]
3. Isothermal calorimetry [Option ID = 7300]
4. Isoelectric focusing [Option ID = 7301]

Correct Answer :-

- Isoelectric focusing [Option ID = 7301]

33) 'Dynamic instability' is a property that is unique to microtubules where the positive ends alternate between growth and shrinkage phases. This has been observed both *in vitro* and *in vivo*. What would be the design of an experiment to study dynamic instability of microtubules in cultured cells?



1. Cool the cultured fibroblasts to 4°C, microinject with labelled tubulin and monitor its incorporation into microtubules by fluorescence microscopy.

[Option ID = 7305]

2. Cool the cultured fibroblasts to 4°C, microinject with labelled tubulin and monitor its incorporation into microtubules by fluorescence microscopy.

[Option ID = 7305]

3. Apply microinjection and fluorescence microscopy techniques to the cells.

[Option ID = 7308]

4. Cool the cultured fibroblasts to 4°C, microinject with labelled tubulin and warm to 37°C. Then monitor the length of individual microtubules by video recordings in a fluorescence microscope

[Option ID = 7309]

Correct Answer :-

- Cool the cultured fibroblasts to 4°C, microinject with labelled tubulin and warm to 37°C. Then monitor the length of individual microtubules by video recordings in a fluorescence microscope

[Option ID = 7309]

34) Which of the following fossil dating methods lead to the revision of the evolutionary time periods for different groups of organisms?

[Question ID = 1830]

1. Study of sugars and amino acid ratio in fossils [Option ID = 7314]
2. Study of protein traces in the rocks [Option ID = 7315]
3. Electron spin resonance and fossil DNA [Option ID = 7316]
4. Study of the possible conditions that lead to fossilization [Option ID = 7317]

Correct Answer :-

- Electron spin resonance and fossil DNA [Option ID = 7316]

35) In a diagnostic laboratory, a technician prepared plastic assay plates for ELISA by coating a solution of the viral protein antigen to the plastic surface. Several samples of serum from suspected infected individuals were tested for the presence of antibodies to the coated proteins. When the assay was performed, all the test samples were positive, including negative control samples that were known not to contain antibodies to the detected antigen. What explanation is the best that fits the facts?

[Question ID = 1831]

1. The technician forgot to "block" the plates with a control protein [Option ID = 7318]
2. The fluorescent labeling compound got dissociated from the labeled antibody [Option ID = 7319]
3. The technician put too much antigen on the plates [Option ID = 7320]
4. Labeled anti-immunoglobulin was not added [Option ID = 7321]

Correct Answer :-

- The technician forgot to "block" the plates with a control protein [Option ID = 7318]

36) Which of the following statements is NOT correct?

[Question ID = 1832]

1. Immunocytochemistry (ICC) technique uses antibodies to localize proteins in tissue sections. [Option ID = 7322]
2. In ICC, the marker enzymes can also be used to label certain (e.g. amine) neurotransmitters. [Option ID = 7323]
3. The direct ICC does not use a secondary antibody and a chromogen. [Option ID = 7324]
4. The indirect ICC uses a secondary antibody as well as chromogen. [Option ID = 7325]

Correct Answer :-

- The direct ICC does not use a secondary antibody and a chromogen. [Option ID = 7324]

37) In size exclusion chromatography, the smallest molecule is:

[Question ID = 1835]

1. eluted before the large molecule is eluted [Option ID = 7331]
2. eluted after larger molecule is eluted [Option ID = 7333]
3. eluted along with largest molecule [Option ID = 7335]
4. adsorbed on the resin [Option ID = 7337]

Correct Answer :-

- eluted after larger molecule is eluted [Option ID = 7333]

38) In Gas Liquid Chromatography, the stationary phase is

[Question ID = 1837]

1. Gas [Option ID = 7339]
2. Liquid [Option ID = 7341]
3. Silica gel [Option ID = 7343]
4. Gas Chrome [Option ID = 7345]

Correct Answer :-

- Liquid [Option ID = 7341]

39) Which of the following microscopy will be the most effective method in visualizing the unstained motile live cells?



1. Fluorescence microscopy [Option ID = 7352]  
2. Phase-contrast microscopy [Option ID = 7353]

Correct Answer :-

- Phase-contrast microscopy [Option ID = 7353]

40) Confocal microscope differs from epi-fluorescent microscope in having a  
[Question ID = 1841]

1. UV lamp as the source of light to illuminate the specimen [Option ID = 7355]
2. High pixel camera and emission filter to capture the image [Option ID = 7357]
3. Laser, PMT and excitation and emission pinhole [Option ID = 7359]
4. Tungsten arc lamp, camera and excitation and emission filter [Option ID = 7361]

Correct Answer :-

- Laser, PMT and excitation and emission pinhole [Option ID = 7359]

41) When a monochromatic light passes through a solution, the intensity of transmitted light  
[Question ID = 1842]

1. Decreases linearly with increasing concentration of solute. [Option ID = 7362]
2. Increases linearly with increasing concentration of solute. [Option ID = 7364]
3. Decreases exponentially with increasing concentration of solute. [Option ID = 7366]
4. Increases exponentially with increasing concentration of solute. [Option ID = 7368]

Correct Answer :-

- Decreases exponentially with increasing concentration of solute. [Option ID = 7366]

42) A sample of protein was boiled in the sample preparation buffer and separated on SDS polyacrylamide gel. However, the size of the protein (50 kDa) under observation was almost double. This could possibly be due to:  
[Question ID = 1845]

1. Because protein has five sites for phosphorylation [Option ID = 7370]
2. Sample was boiled at 90°C instead of 100°C [Option ID = 7372]
3. Sample buffer was lacking SDS [Option ID = 7374]
4. Sample buffer was lacking reducing agent [Option ID = 7376]

Correct Answer :-

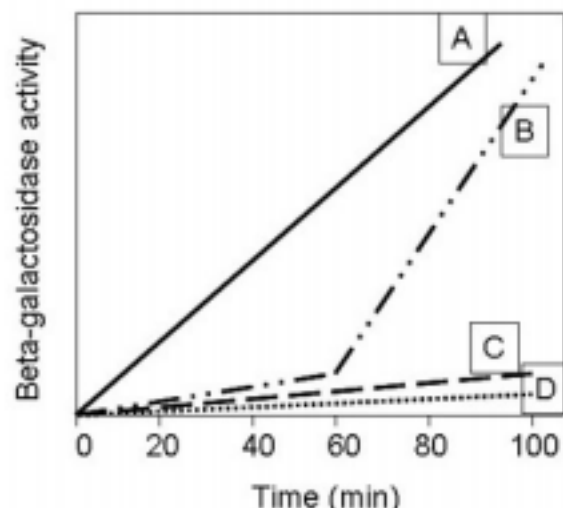
- Sample buffer was lacking reducing agent [Option ID = 7376]

43) *E. coli* cultures were grown in synthetic medium containing glycerol as carbon source and early log phase cultures were split into four flasks labelled as 1, 2, 3 and 4. Following ingredients were added to the respective flasks:

Flask    Ingredients added

1. Medium
2. IPTG (a structural analogues of lactose that induces lac-operon)
3. IPTG + Glucose
4. IPTG + Glucose + cAMP (added after 60 min.)

The bacteria from each culture were removed after every 20 min and the activity of beta-galactosidase was measured. The result was graphically plotted in the following form and represented as A, B, C, and D.



Which one of the following graph line matches





2. A-2, B-4, C-3, D-1

[Option ID = 7383]

3. A-1, B-4, C-3, D-2

[Option ID = 7384]

4. A-2, B-3, C-4, D-1

[Option ID = 7385]

Correct Answer :-

• A-2, B-4, C-3, D-1

[Option ID = 7383]

44) All are nucleotide sequence databases EXCEPT

[Question ID = 1848]

1. Swissprot [Option ID = 7386]

2. EMBL [Option ID = 7388]

3. DDBJ [Option ID = 7390]

4. GenBank [Option ID = 7392]

Correct Answer :-

• Swissprot [Option ID = 7386]

45) All are sequence alignment tools EXCEPT

[Question ID = 1850]

1. Rasmol [Option ID = 7394]

2. BLAST [Option ID = 7395]

3. FASTA [Option ID = 7396]

4. ClustalW [Option ID = 7399]

Correct Answer :-

• Rasmol [Option ID = 7394]

46) A comprehensive database for the study of human genetics and molecular biology is

[Question ID = 1853]

1. PDB [Option ID = 7404]

2. STAG [Option ID = 7406]

3. OMIM [Option ID = 7408]

4. PSD [Option ID = 7409]

Correct Answer :-

• OMIM [Option ID = 7408]

47) Which one is the full form of CPCSEA?

[Question ID = 1855]

1. Committee for the Purpose of Control And Supervision of Experiments on Animals [Option ID = 7412]

2. Committee for the Prevention of Cruelty And Supervision of Experiments on Animals [Option ID = 7414]

3. Consortium for the Prevention of Cruelty And Supervision of Experiments on Animals [Option ID = 7416]

4. Consortium for the Purpose of Control And Supervision of Experiments on Animals [Option ID = 7417]

Correct Answer :-

• Committee for the Purpose of Control And Supervision of Experiments on Animals [Option ID = 7412]

48) Select the INCORRECT statement about e-journals?

[Question ID = 1857]

1. Distribution through digital methods [Option ID = 7419]

2. Always free of cost [Option ID = 7421]

3. Have a set of editors and editorial board members [Option ID = 7423]

4. Serially published at particular intervals [Option ID = 7425]

Correct Answer :-

• Always free of cost [Option ID = 7421]

49) Correlation coefficient is a number between:

[Question ID = 1858]

1. -1 to +1 [Option ID = 7426]

2. -1 to 0 [Option ID = 7429]

3. 0 to +1 [Option ID = 7431]

4. +1 to +2 [Option ID = 7433]

Correct Answer :-

• -1 to +1 [Option ID = 7426]



Which of the following statement is true for the P-value, which denotes significance in statistical testing of the null hypothesis of an experiment?

[Question ID = 1861]

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1. A lower P-value than predetermined significant level means we reject the null hypothesis. [Option ID = 7437]
2. A lower P-value than predetermined significant level means we accept the null hypothesis. [Option ID = 7439]
3. A higher P-value than predetermined significant level means we reject the null hypothesis. [Option ID = 7440]
4. And equal P-value to predetermined significant level means we accept the null hypothesis. [Option ID = 7441]

Correct Answer :-

- A lower P-value than predetermined significant level means we reject the null hypothesis. [Option ID = 7437]

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