Instructions:
(i) Each question carries one mark.
(ii) Choose the correct or most appropriate answer from the given options to the following questions and darken, with blue/black ball point pen the corresponding digit 1, 2, 3 or 4 in the circle pertaining to the question number concerned in the OMR Answer Sheet, separately supplied to you.

BOTANY

1. In Bentham and Hooker’s system of classification, the sub-class Polypetalae and Gamopetalae have the cohorts in the ratio of

(1) 3 : 2  (2) 1 : 1  (3) 2 : 1  (4) 2 : 3

2. In which of the following plants, pollen is released before the stigma becomes receptive in the same flower?

(1) Solanum  (2) Allium  (3) Colchicum  (4) Datura

3. Chromosome number in the endosperm cell of plant ‘A’ and in the root apical meristem cell of plant ‘B’ together equal the chromosome number in the shoot apical meristem cell of Apple. Plants A and B respectively are

(1) Rice, Maize  (2) Maize, Haplopappus
(3) Rice, Potato  (4) Rice, Haplopappus

Rough Work
4. There are 20% Adenines among the bases in a DNA fragment measuring 6.8 nm in length. The number of pentoses, nitrogen base pairs, phosphate groups and hydrogen bonds in this DNA fragment are respectively

6.8 nm దైనంత 6.8 నిమ్మ DNA ద్వయుత్తం 20% అడెన్నినైన సంఖ్య సంఖ్య. ఈ DNA ద్వయుత్తం నిర్మాణం, నిర్మాణ ఉష్ణ చర్మ, నిర్మాణ ఉష్ణ సంఖ్య సంఖ్య నిర్మాణ ఉష్ణ సంఖ్య

(1) 40,20,40,52  (2) 52,20,20,40  (3) 40,52,40,20  (4) 20,40,52,40

5. Match the following lists

<table>
<thead>
<tr>
<th>List-I</th>
<th>List-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) G₁ phase</td>
<td>(I) Replication of DNA</td>
</tr>
<tr>
<td>(B) S phase</td>
<td>(II) Quiescent stage</td>
</tr>
<tr>
<td>(C) G₂ phase</td>
<td>(III) Condensation of chromatin</td>
</tr>
<tr>
<td>(D) G₀ phase</td>
<td>(IV) Protein synthesis</td>
</tr>
<tr>
<td></td>
<td>(V) Interval between mitosis and initiation of DNA replication</td>
</tr>
</tbody>
</table>

మార్క్సింగ్-I     మార్క్సింగ్-II

| (A) G₁ ఫాస్ఫేర్ | (I) DNA తొందరించిన రెండు పార్టుస్పేర్స్          |
| (B) S ఫాస్ఫేర్    | (II) కార్పోస్ట్ స్టేట్స్                                     |
| (C) G₂ ఫాస్ఫేర్  | (III) చోలించిన చర్మ స్పేర్లు                          |
| (D) G₀ ఫాస్ఫేర్  | (IV) పోలీన్ పార్టుస్పేర్లు                          |
|                 | (V) మిటనిసిస్ కంతి సాధనం మరియు క్లోనైస్ లక్షణాలు ఇంటిని ప్రత్యేకంగా నిర్మాణం చేయాలి |

The correct answer is

మార్క్సులు (A) (B) (C) (D)

(1) (V) (II) (III) (IV)
(2) (III) (V) (I) (II)
(3) (V) (IV) (I) (III)
(4) (V) (I) (IV) (II)

Rough Work
6. Match the following lists

**List-I**
(A) Golgi apparatus
(B) Glyoxysomes
(C) Peroxisomes
(D) Endoplasmic reticulum

**List-II**
(I) Conversion of lipids to carbohydrates
(II) Catabolism of long chain fatty acids
(III) Formation of glycoproteins and glycolipids
(IV) Synthesis of lipids
(V) Osmoregulation

The correct answer is

(A) (B) (C) (D) (I) (II) (III) (IV) (V)

7. Which one of the following characters is not found in transverse section of monocot stem?

(1) Starch sheath
(2) Sclerenchymatous bundle sheath
(3) Lysigenous cavity
(4) Sclerenchymatous hypodermis

8. A taxon is observed. Himgiri variety which is resistant to hill bunt disease belongs to this taxon. In this taxon, pollen grains lose viability within 30 minutes of their release from anthers. The taxon belongs to the order

(1) Poales
(2) Sapindales
(3) Polemoniales
(4) Rosales

Rough Work
9. Identify the wrong combination:
(1) Marchantia — Pseudo-elaters
(2) Dryopteris — Rhizome
(3) Cycas — Coralloid roots
(4) Volvox — Colonial form

10. Match the following lists:

List-I
(A) Micrographia
(B) Technique of plant tissue culture
(C) Phylogenetic classification
(D) Absorption of toxic gases by plants

List-II
(I) Skoog
(II) Bessey
(III) Joseph Priestly
(IV) Robert Hooke
(V) Stephan Hales

The correct match is:
(A) (II) (III) (IV) (V)

11. *Trichodesmium erythrium* which gives colour to red sea is a
(1) Brown alga
(2) Green alga
(3) Blue green alga
(4) Red alga

Rough Work
12. Identify the characters of mustard, chilli, cauliflower respectively
   (1) Axile placentaion, tricarpellary gynoecium, sessile flowers
   (2) Inferior ovary, zygomorphic flower, corymb
   (3) Whorled phyllotaxy, unilocular ovary, production of flowers at the same node of the peduncle
   (4) Hypogynous flower, unilocular ovary, corymb

13. Four plants (A, B, C, D) are observed. ‘A’ has cartilaginous endocarp in the fruit and fleshy thalamus as chief edible part. ‘B’ has Caryopsis fruit with endosperm as the chief edible part. In ‘C’, each carpel of apocarpous gynoecium develops into a fruitlet and its mesocarp and endocarp are the chief edible parts. ‘D’ has syconous fruit with edible fleshy peduncle. To which families A, B, C and D belong respectively?
   (1) Rosaceae, Poaceae, Annonaceae, Moraceae
   (2) Annonaceae, Rosaceae, Moraceae, Rutaceae
   (3) Solanaceae, Cucurbitaceae, Anacardiaceae, Moraceae
   (4) Rutaceae, Anacardiaceae, Rosaceae, Fabaceae

Rough Work
14. Match the following lists

<table>
<thead>
<tr>
<th>List-I</th>
<th>List-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) <em>Alstonia</em></td>
<td>(I) Roots at lower nodes of the stem</td>
</tr>
<tr>
<td>(B) <em>Ananus sativus</em></td>
<td>(II) Leaflets are attached at a common point in the leaf</td>
</tr>
<tr>
<td>(C) Sugarcane</td>
<td>(III) Swollen placenta</td>
</tr>
<tr>
<td>(D) <em>Bombax ceiba</em></td>
<td>(IV) More than two leaves at every node</td>
</tr>
<tr>
<td></td>
<td>(V) Underground lateral branches producing aerial leafy shoots</td>
</tr>
</tbody>
</table>

ఎక్కడ సాధ్యం కలిగి || ఎక్కడ సాధ్యం కలిగి

| ఎక్కడ సాధ్యం కలిగి | (I) మధ్యరిఖై సుమారు కొండానికి నీటి        |
| (B) వాసువి రాళ్ళి    | (II) మధ్యరిఖై సుమారు నీటిని ఒకటికి నిలుచు చేసుకోండానికి        |
| (C) ల్యాన్స్      | (III) మధ్యరిఖై అంతికి కుడిని నిలుచు చేసుకోండానికి |
| (D) మాగాడి విద్యా      | (IV) మధ్యరిఖై అంతికి కుడిని నిలుచు చేసుకోండానికి |
|                             | (V) మధ్యరిఖై అంతికి కుడిని నిలుచు చేసుకోండానికి |

The correct match is

<table>
<thead>
<tr>
<th>(A)</th>
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<th>(C)</th>
<th>(D)</th>
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</thead>
<tbody>
<tr>
<td>(I)</td>
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<td>(III)</td>
<td>(I)</td>
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<tr>
<td>(4)</td>
<td>(V)</td>
<td>(III)</td>
<td>(II)</td>
</tr>
</tbody>
</table>

Rough Work
15. Identify the wrong pair of statements

(I) Number of stamens in 5 flowers of *Allium* is equal to those in 5 flowers of *Solanum*.

(II) The microsporangia of *Hibiscus* and *Asparagus* are having 80 pollen grains each. Then the ratio of the number of pollen grains produced from each stamen of these two plants is 1 : 1.

(III) The ratio of the number of stamens in the flowers of *Pisum* and *Datura* is 2 : 1.

(IV) The number of carpels in a flower of *Smilax* is equal to the number of carpels in a cyathium inflorescence.

16. Wind pollinated plants generally do not show the following character

(I) Flowers are large and colourful

(II) Feathery stigma

(III) Single ovule in the ovary

(IV) Well exposed stamens
17. Identify the pair of wrong statements in the following
(I) Intine of pollen grain is made up of sporopollenin.
(II) Pollen grains are well preserved as fossils because of the presence of sporopollenin.
(III) Enzymes can degrade the organic material of the exine of pollen grain.
(IV) Sporopollenin can withstand high temperatures, strong acids and alkali.

(i) (ii), (iii)  
(ii) (iii), (iv)  
(iii) (i), (iii)  
(iv) (i), (ii)

18. Study the following lists

List-I
(A) BOD  
(B) KVIC  
(C) LAB  
(D) STPs  

List-II
(I) Treatment of sewage  
(II) Measure of organic matter in water  
(III) Biological methods for controlling plant diseases  
(IV) Increases vitamin B₁₂  
(V) Production of Biogas

(i) (ii), (iii)  
(ii) (iii), (iv)  
(iii) (i), (iii)  
(iv) (i), (ii)

The correct match is

(A) (B) (C) (D)  
(1) (II) (V) (IV) (I)  
(2) (IV) (III) (II) (V)  
(3) (V) (II) (III) (I)  
(4) (II) (I) (IV) (V)
19. Identify the correct pair of combination

(I) Parbhani Kranti — Resistance to Virus — Bhindi
(II) Pusa Gaurav — Resistance to Aphids — Mustard
(III) Pusa Sadabahar — Resistance to fruit borer — Cow pea
(IV) Pusa Shubhra — Resistance to white rust — Cauliflower

(1) (I), (III) (2) (II), (III) (3) (II), (IV) (4) (I), (II)

20. Study the following lists

List-I
(A) RNAi (B) ELISA (C) PCR (D) Cry I Ab

List-II
(I) Cotton bollworms (II) Early detection of HIV (III) Meloidogyne resistance (IV) Antigen-Antibody interaction (V) Corn borer

(I) (II) (III) (IV) (V)

The correct match is

(A) (B) (C) (D)

(1) (V) (I) (III) (II) (2) (III) (IV) (II) (V) (3) (IV) (III) (I) (V) (4) (II) (III) (V) (IV)

Rough Work
21. Assume that the occurrence of nitrogen bases in adjacent positions in a DNA strand is random. Identify the minimum number of nucleotides in a DNA strand where GAAT can occur once on the basis of probability?

DNA  అంతర్జాల స్థానాలలో నియోగాటి నిన్ని విధానాలు ఎంతవరకు ఎక్కిపించబడింది. ఎందుకుంటే
అంతర్జాలు GAAT రేకు ఎంతద్వారా ప్రశాంతుగా డానా పల్లిలో
విస్తరించబడుతుంది

(1) 1024     (2) 512     (3) 256     (4) 4096

22. Some foreign DNA fragment is attached to Cla I site of pBR322. This recombinant vector is used to transform Escherichia coli host cells. The cells subjected to transformation are plated on two different media—one containing ampicillin and the other containing tetracycline. The transformed cells containing the recombinant vector

(1) will grow on ampicillin but not on tetracycline containing medium
(2) will grow on both tetracycline containing and ampicillin containing media
(3) will not grow on either tetracycline containing or ampicillin containing media
(4) will grow on tetracycline but not on ampicillin containing medium

ప్రత్యామ్నాయం DNA ప్రతి pBR322 స్థానం Cla I స్త్రోయం అంతర్జాలు రేకు. నియోగాటి రేకు
అంతర్జాలు తరలించడంలో ఒకటి అంతర్జాలు రేకు అమ్పిసిలిన్ సంపాదించబడుతుంది. మరొకటితో తరలించడంలో
తరలించడం రేకు అమ్పిసిలిన్ సంపాదించబడింది. అంతర్జాలు రేకు అంతర్జాలు సంపాదించబడింది

(1) నియోగాటి రేకు అమ్పిసిలిన్ సంపాదించదు, తరలించడం రేకు తరలించకుండా ఉంటుంది
(2) నియోగాటి రేకు తరలించడం అమ్పిసిలిన్ రేకు సంపాదించడం
(3) నియోగాటి రేకు తరలించడం అమ్పిసిలిన్ సంపాదించడం
(4) నియోగాటి రేకు తరలించడం అమ్పిసిలిన్ సంపాదించడం

Rough Work
23. Identify the correct pair of combinations

(I) $^{14}$C — Distinction between PS I and PS II
(II) $^{15}$N — Semiconservative replication of DNA
(III) $^{35}$S — Polypeptide synthesis
(IV) $^{32}$P — Identification of chemical nature of genetic material

(1) (I), (III) (2) (II), (III) (3) (II), (IV) (4) (I), (II)

24. Study the following lists

**List-I**
(A) Exon
(B) Capping
(C) Tailing
(D) Promoter

**List-II**
(I) Site for binding of RNA polymerase
(II) Coding sequence
(III) Lagging strand
(IV) Methyl guanosine triphosphate
(V) Adenylate residues

(1) (I) (2) (II) (3) (III) (4) (IV) (5) (V)

The correct match is

<table>
<thead>
<tr>
<th>(A)</th>
<th>(B)</th>
<th>(C)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(IV)</td>
<td>(II)</td>
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<td>(3)</td>
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<td>(IV)</td>
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</tr>
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<td>(4)</td>
<td>(III)</td>
<td>(I)</td>
<td>(II)</td>
</tr>
</tbody>
</table>

**Rough Work**
25. If the codon GGU is reversed, the resulting codon will code for this amino acid.

GGU → (1) Thr (2) Tyr (3) Trp (4) Leu

26. Tall (T) is completely dominant over dwarf (t). Red flower colour (R) is incompletely dominant over white (r), the heterozygote being pink. Plant having genotype of Tt Rr is self pollinated. What would be the proportion of plants with dwarf and pink characters in its progeny?

(1) 3/16 (2) 2/16 (3) 1/16 (4) 9/16

27. A cross between two tall garden pea plants produced all tall plants. The possible genotypes of the parents are

(I) TT, TT
(II) TT, Tt
(III) Tt, tt
(IV) Tt, Tt

The correct answer is

(1) (II), (III) (2) (III), (IV) (3) (I), (IV) (4) (I), (II)
28. Identify the correct pair of combination
(I) Viroid — Bovine Spongiform Encephalitis
(II) Prion — Creutzfeldt-Jakob disease
(III) Measles virus — Glycoprotein projections
(IV) Rabies virus — Polyhedral symmetry

(1) (II), (III) (2) (III), (IV) (3) (I), (III) (4) (I), (II)

29. Beggiotoa is a
(1) Chemoheterotroph (2) Chemoautotroph
(3) Photoautotroph (4) Photoheterotroph

(1) (2) (3) (4)

30. In flowering plants, the site of perception of light/dark duration is
(I) Floral meristem (2) Stem
(3) Leaves (4) Shoot apex

(1) (2) (3) (4)

Rough Work
31. Study the following lists

List-I
(A) Early seed production in conifers
(B) Seed development and maturation
(C) Lateral shoot growth
(D) Root hair formation

List-II
(I) Indole substance
(II) Terpene substance
(III) Volatile substance
(IV) Adenine derivative
(V) Carotenoid derivative

The correct match is

(A) (B) (C) (D)
(1) (IV) (III) (II) (I)
(2) (III) (I) (V) (II)
(3) (II) (V) (IV) (III)
(4) (II) (I) (V) (IV)

Rough Work
32. Assertion (A): The RQ value of fats is less than one.

Reason (R): The amount of CO₂ released is less than the O₂ consumed when fats are used in respiration.

The correct answer is

(1) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(2) (A) is true but (R) is false.
(3) (A) is false but (R) is true.
(4) Both (A) and (R) are true and (R) is the correct explanation of (A).

33. The form of carbon used for the carboxylation of phosphoenol pyruvate in C₄ plants is

C₄ అంకలు ప్యారువెట్ట కోసం పాశ్చర్యమైన ఏనాంగ్రాసి అనేకాంతర శాసనాలు సంచాలనీ చేస్తారు

(1) HCO₃⁻
(2) H₂CO₃
(3) C₂H₄
(4) CH₄

Rough Work
34. **Assertion (A):** Higher yields in case of bell pepper can be achieved by growing them in carbon dioxide enriched green houses.

**Reason (R):** Due to higher intracellular CO₂ concentration in bundle sheath cells, RuBisCo mainly acts as carboxylating enzyme.

The correct answer is:

(i) Both (A) and (R) are true but (R) is not the correct explanation of (A).
(ii) (A) is true but (R) is false.
(iii) (A) is false but (R) is true.
(iv) Both (A) and (R) are true and (R) is the correct explanation of (A).

35. Identify the correct pair of statements

(I) Niacin containing coenzyme facilitates the oxidation of malate in the matrix of mitochondria.

(II) Haem is the prosthetic group for the enzyme which catalyses the carboxylation of RuBP in the stroma of chloroplast.

(III) The electron carrier between cytochrome ‘C’ reductase and cytochrome ‘C’ oxidase is attached to the inner surface of inner membrane of mitochondria.

(IV) Water splitting reaction in the lumen of thylakoid requires chlorine.

The correct answer is:

(I) (III), (IV)  
(II) (I), (II)  
(III) (I), (IV)  
(IV) (II), (III)
36. Study the following lists concerning the deficiency diseases and role of elements

**List-I**
(A) Die-back in citrus  
(B) Mottled leaf  
(C) Mouse ear in pecan  
(D) Whip tail in cauliflower

**List-II**
(I) Urease  
(II) Hexokinase  
(III) Nitrogenase  
(IV) Cytochrome ‘C’ oxidase  
(V) Carboxypeptidase

The correct match is:

<table>
<thead>
<tr>
<th>(A)</th>
<th>(B)</th>
<th>(C)</th>
<th>(D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>(V)</td>
<td>(II)</td>
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</tr>
<tr>
<td>(4)</td>
<td>(IV)</td>
<td>(I)</td>
<td>(III)</td>
</tr>
</tbody>
</table>

37. Study the following table showing the components of water potential of four cells of an actively transpiring plant:

<table>
<thead>
<tr>
<th>Cell</th>
<th>Solute potential (MPa)</th>
<th>Pressure potential (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-0.68</td>
<td>0.42</td>
</tr>
<tr>
<td>B</td>
<td>-0.75</td>
<td>0.36</td>
</tr>
<tr>
<td>C</td>
<td>-0.83</td>
<td>0.47</td>
</tr>
<tr>
<td>D</td>
<td>-0.57</td>
<td>0.29</td>
</tr>
</tbody>
</table>

Identify the four cells as root hair, cortical cell, endodermal cell (lacking caspian strips) and pericycle cell respectively in the young root (assuming symplastic water flow through them).

(1) A, C, B, D  
(2) B, D, C, A  
(3) D, A, C, B  
(4) A, D, C, B

Rough Work
38. Match the following lists

List-I

(A) Salvinia
(B) Lichens
(C) Rhizophora
(D) Utricularia

List-II

(I) Submerged, suspended hydrophyte
(II) Amphibious plant
(III) Heterosporous plant
(IV) Soil formation
(V) Halophyte

```
<table>
<thead>
<tr>
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</tr>
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<td>(D)</td>
<td>(IV)</td>
</tr>
</tbody>
</table>
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The correct answer is

```
(A) (B) (C) (D)
(I) (II) (III) (IV)
```

Rough Work
39. Identify the wrong pair of statements

(I) During plant succession, some species colonise an area and their populations become more numerous, whereas populations of other species decline and even disappear.

(II) Both hydrarch and xerarch successions lead to mesic conditions.

(III) Secondary succession is a slow process when compared to primary succession.

(IV) In the successive seral stages, there is no change in the diversity of species of organisms.

(I) (I), (III)  (2) (II), (III)  (3) (I), (II)  (4) (III), (IV)

40. Identify the correct pair of statements

(I) Functions of sieve tubes are controlled by the nucleus of companion cells.

(II) Albuminous cells are present in angiosperms.

(III) In dicot root, the vascular cambium is completely secondary in origin.

(IV) Cylindrical meristems contribute to the formation of primary plant body.

(I) (II), (III)  (2) (I), (III)  (3) (III), (IV)  (4) (I), (II)
41. Skin color in man is an example of
   (1) Polygenic inheritance
   (2) Sex-linked inheritance
   (3) Multiple allelism
   (4) Pleiotropy

   (1) రుద్రాభావం విశ్వసనం
   (2) సైన్ ధర్మాన విశ్వసనం
   (3) రుద్రాభావం విశ్వసనం
   (4) ప్లియోట్రిపి

42. Match the following

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   (1) రుద్రాభావం విశ్వసనం
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The correct answer is

(A) (B) (C) (D)
(1) (IV) (III) (I) (V)
(2) (IV) (III) (II) (I)
(3) (III) (IV) (II) (I)
(4) (III) (I) (II) (IV)

Rough Work
43. The inner lining of the ducts of sweat glands and pancreatic duct is formed by this epithelium

(1) Pseudostratified  
(2) Stratified cuboidal  
(3) Stratified non-keratinised squamous  
(4) Transitional

44. Match the following

List-I
(A) Jim Corbett National Park  
(B) Kaziranga National Park  
(C) Mahavir Harina Vanasthali National Park  
(D) Keoladeo Ghana National Park

List-II
(I) Gujarat  
(II) Andhra Pradesh  
(III) Rajasthan  
(IV) Uttarakhand  
(V) Assam

The correct answer is

(A) (B) (C) (D)
(1) (IV) (V) (II) (III)
(2) (II) (V) (IV) (III)
(3) (II) (I) (III) (IV)
(4) (IV) (I) (II) (V)

Rough Work
45. Males produce sperms by mitosis in
   (1) Lepisma   (2) Periplaneta americana
   (3) Apis mellifera   (4) Drosophila melanogaster

46. The protozoan with heliopodia as locomotory structures
   (1) Euglypha   (2) Actinophrys   (3) Entamoeba   (4) Elphidium

47. In the following functional human lung studies, identify the total lung capacity
   (A) Inspiratory capacity (IC)
   (B) Functional residual capacity (FRC)
   (C) Vital capacity (VC)
   (D) Inspiratory reserve volume (IRV)
   (E) Residual volume (RV)
   (F) Expiratory reserve volume (ERV)
   (G) Tidal volume (TV)

   ప్రకృతితో ప్రయోగాల సంఖ్య డానిలో పిల్లక పోషన్ క్రియలు

   (A) ఇంప్రియార్టర్ కాపిచేస్ (IC)
   (B) ఫంక్షనల్ రెసిడయల్ కాపిచేస్ (FRC)
   (C) విటల్ కాపిచేస్ (VC)
   (D) ఇంప్రియార్టర్ రెసర్వ్ వల్వుల్ (IRV)
   (E) రెసిడయల్ వల్వుల్ (RV)
   (F) ఇంప్రియార్టర్ రెసర్వ్ వల్వుల్ (ERV)
   (G) టిడిల్ వల్వుల్ (TV)

   The correct answer is

   (1) (C) + (E)   (2) (D) + (F)   (3) (A) + (D)   (4) (B) + (C)
48. A Molluscan with calcareous spicules is
(1) Chaetoderma (2) Lepidopleurus (3) Doris (4) Neopilina

49. Proteus anguinus is an example for
(1) Photokinesis (2) Circannular Rhythms
(3) Effect of light on Pigmentation (4) Phototaxis

50. Male heterogametic sex, XX, XO type of sex determination is found in
(1) Drosophila (2) Butterflies
(3) Moths (4) Grasshoppers

51. Choose the functions of sympathetic nervous system
(1) Dilates blood vessels, stimulates salivary secretions
(2) Constricts bronchi and pupil of eye
(3) Increases heart rate, relaxes bronchi
(4) Decreases heart rate, increases peristalsis

Rough Work
52. Note the following features and choose the ones applicable to *Wuchereria bancrofti*:
(A) Coelozoic parasite
(B) Histozoic parasite
(C) Monogenetic parasite
(D) Digenegetic parasite
(E) Monomorphic acelomate parasite
(F) Dimorphic pseudocelomate parasite

53. Minisatellites or VNTR’s are used in:
(1) gene mapping
(2) DNA fingerprinting
(3) Polymerase chain reaction (PCR)
(4) gene therapy

54. Emulsified fats are digested by:
(1) Pancreatic juice and intestinal juice
(2) Gastric juice and pancreatic juice
(3) Bile juice and intestinal juice
(4) Pancreatic juice and bile juice

55. The factor which initiates the intrinsic pathway of blood clotting and triggers cascade reaction is:
(1) Hageman’s factor
(2) Anti-haemophilic factor
(3) Christmas factor
(4) Stuart-Prower factor
56. In which “Assisted Reproductive Technology” (ART), “Test Tube Baby” procedure is applied?
(1) Zygote-intrafallopian transfer (ZIFT) 
(2) Gamete intrafallopian transfer (GIFT) 
(3) Intracytoplasmic sperm injection (ICSI) 
(4) In vitro fertilization and embryo transfer (IVFET)

57. Choose the correct statements with reference to organic evolution
(A) Flippers of whale and wing of bat exhibit analogy
(B) Wing of butterfly and wing of bird exhibit homology
(C) Organs with dissimilar structure are called analogous organs
(D) Organs with similar structure and origin are called homologous organs

58. With reference to Phylum Echinodermata, identify the classes which have Pedicillariae.
(1) Ophiuroidea and Holothuroidea 
(2) Crinoidea and Holothuroidea 
(3) Holothuroidea and Echinoida 
(4) Astroidea and Echinoidea
59. Dense regular connective tissue is present in
(I) Pericardium and heart valves (2) Ligaments and tendons
(3) Joint capsule and Wharton’s jelly (4) Periosteum and endosteum

60. The secondary stem cells that produce Neutrophils is
(I) Erythrocyte committed progenitor (2) Granulocyte-monocyte progenitor
(3) B-cell committed progenitor (4) Megakaryoblast

61. Match the following

Set-I
(A) Natural active immunity
(B) Natural passive immunity
(C) Artificial active immunity
(D) Artificial passive immunity

Set-II
(I) Develops due to vaccination
(II) Anti-rabies serum
(III) Acquired after smallpox infection
(IV) Transferred from mother to child

The correct match is
(A) (B) (C) (D)
(I) (II) (III) (IV)

Rough Work
62. Match the following

List-I
(A) Zygomatic bone 
(B) Lacrimal bones 
(C) Parietal bones 
(D) Sphenoid bone

List-II
(I) Keystone bone of cranium 
(II) Cheek bone of cranium 
(III) Smallest bone of face 
(IV) Roof of cranium 
(V) Floor of cranium

The correct match is
(A) (B) (C) (D)
(I) (II) (III) (IV) (V)
(2) (I) (III) (V) (II)
(3) (II) (III) (IV) (I)
(4) (II) (IV) (I) (III)

63. The muscles of human eye receive impulses by the innervation of these cranial nerves

(1) IX, X, IV (2) VI, III, X  (3) III, IV, X (4) III, IV, VI

Rough Work
64. Match the following

List-I

(A) Leydig cells
(B) Sertoli cells
(C) Rete testis
(D) Corpus luteum

List-II

(I) Carry sperms from seminiferous tubules to vasa efferentia
(II) Nourish sperms
(III) Secretion of testosterone
(IV) Secretion of progesterone
(V) Secretion of oxytocin

పరిస్థితి విలువల పరిస్థితి

పరిస్థితి-I

(A) లేడిగ్ సామను
(B) సర్టోలి సామను
(C) రెటె టెస్టిస్
(D) కపరస్సు లయ్యుట్

పరిస్థితి-II

(I) స్పర్స్ తండ్రి సేమన్ఫిరిస్ తండ్రి ను వాసా ఎఫేరెం తాండ్రిలో కారియేం సూప్రెట్స్
(II) స్పర్స్ తండ్రి ను నచ్చి తాండ్రిలు
(III) స్పర్స్ తండ్రి ను నచ్చి తాండ్రిలు
(IV) స్పర్స్ తండ్రి ను నచ్చి తాండ్రిలు
(V) స్పర్స్ తండ్రి ను నచ్చి తాండ్రిలు

The correct match is

(1) (2) (3) (4)

(A) (B) (C) (D)

(1) (II) (I) (V)

(2) (II) (III) (V) (IV)

(3) (III) (II) (I) (IV)

(4) (III) (II) (V) (IV)

Rough Work
65. In the life cycle of Ascaris lumbricoides rhabditiform larva undergoes 2\textsuperscript{nd} and 3\textsuperscript{rd} moltings in 

(1) Small intestine
(2) Liver
(3) Heart
(4) Alveoli of lungs

66. Statement (S) : Lancelets are jawless, primitive fish like vertebrates.
Reason (R) : In lancelets notochord, tubular nerve cord and pharyngeal gill slits are present throughout their life.

The correct answer is

(1) Both (S) and (R) are correct and (R) is not the correct explanation to (S).
(2) (S) is correct but (R) is wrong.
(3) (S) is wrong but (R) is correct.
(4) Both (S) and (R) are correct and (R) is the correct explanation to (S).

Rough Work

AM 2014 B
67. Match the following with reference to Adaptations

<table>
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<tr>
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<tbody>
<tr>
<td>(A) Sea gulls</td>
<td>(I) Chloride secreting glands</td>
</tr>
<tr>
<td>(B) Kangaroo rat</td>
<td>(II) Water cells in rumen</td>
</tr>
<tr>
<td>(C) Turtles</td>
<td>(III) Salt excreting glands</td>
</tr>
<tr>
<td>(D) Salmon</td>
<td>(IV) Oxidation of fats to generate water</td>
</tr>
<tr>
<td></td>
<td>(V) Anadromous migration</td>
</tr>
</tbody>
</table>

The correct match is

(A) (B) (C) (D)  
(I) (III) (IV) (I) (V)
(II) (IV) (III) (I)
(III) (II) (I) (V)
(IV) (II) (III) (IV) (I)

68. Which of the following helps to maintain species diversity in a community?

(1) Facultative parasites  
(2) Omnivores
(3) Predators       
(4) Herbivores

The correct match is

(1) (2) (3) (4)
69. Which one of the following is the first step in allopatric speciation?
(1) Polyploidy  (2) Geographic isolation
(3) Hybridization  (4) Genetic drift

70. In Periplaneta, which one of the following helps to nourish the sperms?
(1) Utriculi breviores  (2) Ejaculatory duct
(3) Vas deferens  (4) Utriculi majores

71. In Periplaneta, ductus ejaculatorius of male reproductive system lies in
(1) 6th segment  (2) 7th segment  (3) 8th segment  (4) 5th segment

72. The type of syngamy seen in Trychonympha is
(1) Conjugation  (2) Hologamy
(3) Anisogamy  (4) Isogamy

73. The biochemical procedure used to detect human chorionic gonadotrophin (hCG) is
(1) ELISA  (2) WIDAL  (3) CAT  (4) MRI
74. In EEG, the waves which are quite low in frequency and having high amplitude are
(1) Alpha waves         (2) Theta waves
(3) Delta waves         (4) Beta waves

75. Match the following

List-I
(A) Down syndrome
(B) Edward syndrome
(C) Klinefelter’s syndrome
(D) Patau syndrome
(E) Turner’s syndrome

List-II
(I) 45, X
(II) 47, XX, +13
(III) 47, XX, +18
(IV) 47, XX, +21
(V) 47, XXY

The correct match is:

(A)  (B)  (C)  (D)  (E)
(1)  (IV)  (II)  (V)  (III)  (I)
(2)  (III)  (IV)  (II)  (I)  (V)
(3)  (II)  (III)  (IV)  (V)  (I)
(4)  (IV)  (III)  (V)  (II)  (I)

Rough Work
76. Choose the wrong statement with reference to subspecies
(1) They show minor variations from parent population
(2) They do not interbreed with individuals of other species
(3) They are new species in the making
(4) Geographically isolated population of a species

77. Erythropoietin is a hormone produced from
(1) Kidney
(2) Thymus
(3) Pituitary
(4) Heart

78. Intra abdominal testes are found in
(1) Canis and Felis
(2) Panthera and Equus
(3) Macaca and Macropus
(4) Balaenoptera and Delphinus
79. Match the following

List-I

(Part of nephron)

(A) Proximal convoluted tubule
(B) Distal convoluted tubule
(C) Descending limb of Henle’s loop
(D) Ascending limb of Henle’s loop

List-II

(Function)

(I) Impermeable to sodium ions
(II) Impermeable to water
(III) Facultative reabsorption of water and Na^+
(IV) Reabsorption of nutrients and Na^+

The correct match is

(A) (B) (C) (D)
(1) (IV) (II) (I) (III)
(2) (III) (IV) (II) (I)
(3) (III) (IV) (I) (II)
(4) (IV) (III) (I) (II)

80. In Alpha Thalassemia the gene HBA1 is located on this chromosome

(1) 16 (2) 8 (3) 22 (4) 9

Rough Work

AM 2014 B 34 R
81. Five resistances are connected as shown in figure. If total current flowing is 0.5 A, then the potential difference $V_A - V_B$ is

\[ \text{4 V} \quad \text{8 V} \quad \text{6 V} \quad \text{2 V} \]

82. A particle with charge $q$ is moving along a circle of radius $R$ with uniform speed $V$. The associated magnetic moment $\mu$ is given by

\[ \frac{1}{2} q^2 V R \quad \frac{1}{2} V^2 R \quad \frac{1}{4} q V R \quad \frac{1}{2} q V R \]

83. A wire of length $L$ meters carrying a current $I$ amperes is bent in the form of a circle. The magnitude of the magnetic moment is

\[ \frac{LI}{4\pi} \quad \frac{L^2 I^2}{4\pi} \quad \frac{LI}{4\pi^2} \quad \frac{L^2 I}{4\pi} \]

Rough Work
84. The major contribution of Sir C.V. Raman is
   (1) Explanation of photoelectric effect
   (2) Principle of buoyancy
   (3) Scattering of light by molecules of a medium
   (4) Electromagnetic theory

85. If the absolute errors in two physical quantities A and B are a and b respectively, then the absolute error in the value of A – B is
   (1) a – b
   (2) b – a
   (3) a + b
   (4) a + b

86. A particle starts moving from rest with uniform acceleration. It travels a distance x in first 2 seconds and distance y in the next 2 seconds. Then
   (1) y = 2x
   (2) y = 3x
   (3) y = 4x
   (4) y = x

Rough Work

AM 2014 B 36 R
87. At time \( t = 0 \), two bodies A and B are at the same point. A moves with constant velocity \( V \) and B starts from rest and moves with constant acceleration. Relative velocity of B with respect to A when the bodies meet each other is

(1) \( 2V \) \hspace{1cm} (2) \( \frac{V}{2} \)

(3) \( \frac{V}{3} \) \hspace{1cm} (4) \( V \)

88. A body is projected horizontally from the top of a tower with a velocity of 10 m/s. If it hits the ground at an angle of 45°, the vertical component of velocity when it hits ground in m/s is

(1) 10 \hspace{1cm} (2) \( 10\sqrt{2} \) \hspace{1cm} (3) \( 5\sqrt{2} \) \hspace{1cm} (4) 5

89. A body is projected with an angle \( \theta \). The maximum height reached is \( h \). If the time of flight is 4 sec and \( g = 10 \text{ m/s}^2 \), then the value of \( h \) is

(1) 10 m \hspace{1cm} (2) 40 m \hspace{1cm} (3) 20 m \hspace{1cm} (4) 5 m

Rough Work
90. The linear momentum of a particle varies with time \( t \) as \( P = a + bt + ct^2 \). Then which of the following is correct?
(1) Force is dependent linearly on time
(2) Velocity of particle is inversely proportional to time
(3) Displacement of the particle is independent of time
(4) Force varies with time in a quadratic manner

91. A horizontal force \( F \) is applied to a block of mass \( m \) on a smooth fixed inclined plane of inclination \( \theta \) to the horizontal as shown in the figure. Resultant force on the block up the plane is

\[
F \cos \theta - mg \sin \theta
\]

(1) \( F \cos \theta - mg \sin \theta \)
(2) \( F \sin \theta + mg \cos \theta \)
(3) \( F \sin \theta - mg \cos \theta \)
(4) \( F \cos \theta + mg \sin \theta \)
92. A body of 200 g begins to fall from a height where its potential energy is 80 J. Its velocity at a point where kinetic and potential energies are equal is

1. \( 10\sqrt{8} \text{ m/s} \)
2. \( 4 \text{ m/s} \)
3. \( 400 \text{ m/s} \)
4. \( 20 \text{ m/s} \)

93. A bullet moving with a velocity of \( 30\sqrt{2} \text{ m/s} \) is fired into a fixed target. It penetrated into the target to the extent of 8 meters. If the same bullet is fired into a target of thickness \( \frac{S}{2} \) meters and of the same material with the same velocity, the bullet comes out of the target with velocity

1. \( 10\sqrt{2} \text{ m/s} \)
2. \( 20 \text{ m/s} \)
3. \( 30 \text{ m/s} \)
4. \( 20\sqrt{2} \text{ m/s} \)

94. Keeping the mass of earth as constant, if its radius is reduced to \( \frac{1}{4} \) th of its initial value, then the period of revolution of earth about its own axis and passing through the centre, in hours, is (Assume earth to be a solid sphere and its initial period of rotation as 24 hrs)

1. 1.5
2. 12
3. 3
4. 6
95. Three uniform circular discs, each of mass $M$ and radius $R$ are kept in contact with each other as shown in the figure. Moment of inertia of the system about the axis $AB$ is

(1) $\frac{7}{4} MR^2$ \hspace{1cm} (2) $\frac{11}{4} MR^2$

(3) $\frac{11}{2} MR^2$ \hspace{1cm} (4) $\frac{MR^2}{4}$

96. If a body is executing simple harmonic motion and its current displacement is $\frac{\sqrt{3}}{2}$ times the amplitude from its mean position, then the ratio between potential energy and kinetic energy is

(1) $3 : 1$ \hspace{1cm} (2) $3 : 2$

(3) $2 : 3$ \hspace{1cm} (4) $\sqrt{3} : 2$

Rough Work
97. At a height $H$ from the surface of the earth, the total energy of a satellite is equal to the potential energy of a body of equal mass at a height of $3R$ from the surface of earth. ($R =$ Radius of the earth). The value of $H$ is

$$\frac{R}{3} \quad \frac{R}{2} \quad \frac{4R}{3} \quad 3R$$

98. A copper wire and a steel wire of the same length and same cross-section are joined end to end to form a composite wire. The composite wire is hung from a rigid support and a load is suspended from the other end. If the increase in length of the composite wire is 2.4 mm, then the increase in lengths of steel and copper wires are

$$(Y_{Cu} = 10 \times 10^{10} \text{ N/m}^2, Y_{Steel} = 2 \times 10^{11} \text{ N/m}^2)$$

(1) 0.4 mm, 2.0 mm  
(2) 1.2 mm, 1.2 mm  
(3) 0.6 mm, 1.8 mm  
(4) 0.8 mm, 1.6 mm

99. Under isothermal condition, energy $E$ is supplied to a soap bubble of surface tension $\sigma$ and radius $r$, to double the radius of the soap bubble. The value of $E$ is

$$\frac{12\pi r^2 \sigma}{2} \quad \frac{16\pi^2 r^2 \sigma}{(2)} \quad \frac{24\pi^2 r^2 \sigma}{(3)} \quad \frac{8\pi^2 r^2 \sigma}{(4)}$$

Rough Work
100. The length of a steel rod is 5 cm more than that of a brass rod. If this difference in their lengths is to remain the same at all temperatures, then the length of brass rod will be

(Coefficient of linear expansion for steel and brass are \(12 \times 10^{-6} \degree C\) and \(18 \times 10^{-6} \degree C\) respectively)

\[\text{(1) 10 cm} \quad \text{(2) 20 cm} \quad \text{(3) 15 cm} \quad \text{(4) 5 cm}\]

101. A block of ice of mass 50 kg is sliding on a horizontal plane. It starts with speed 5 m/s and stops after moving through some distance. The mass of ice that has melted due to friction between the block and the surface is (Assuming that no energy is lost and latent heat of fusion of ice is 80 cal/g, J = 4.2 J/cal)

\[\text{(1) 1.86 g} \quad \text{(2) 2.86 g} \quad \text{(3) 3.86 g} \quad \text{(4) 0.86 g}\]

102. A Carnot refrigerator extracts heat from water at 0\(^\circ\)C and rejects it to room at 24.4\(^\circ\)C. The work required by the refrigerator for every 1 kg of water converted into ice (latent heat of ice = 336 kJ/kg) is

\[\text{(1) 24.4 kJ} \quad \text{(2) 30 kJ} \quad \text{(3) 336 kJ} \quad \text{(4) 11.2 kJ}\]
103. Heat is supplied to a diatomic gas at constant pressure. The ratio between heat energy supplied and work done is ($\gamma$ for diatomic gas = 7/5)

(1) 2 : 5  (2) 3 : 4  (3) 2 : 1  (4) 7 : 2

104. A closed pipe and an open pipe of same length produce 2 beats, when they are set into vibration simultaneously in their fundamental mode. If the length of the open pipe is halved, and that of closed pipe is doubled, and if they are vibrating in the fundamental mode, then the number of beats produced is

(1) 8  (2) 4  (3) 7  (4) 2

105. A concave lens of focal length $f$ forms an image which is $\frac{1}{3}$ times the size of the object. Then, the distance of object from the lens is

(1) $\frac{3}{2} f$  (2) $2 f$  (3) $f$  (4) $\frac{2}{3} f$

106. An astronomical telescope arranged for normal adjustment has a magnification of 6. If the length of the telescope is 35 cm, then the focal lengths of objective and eye piece respectively are

(1) 30 cm, 6 cm  (2) 30 cm, 5 cm  (3) 5 cm, 30 cm  (4) 40 cm, 5 cm

Rough Work
107. In Young double-slit interference experiment using two coherent waves of different amplitudes, the intensity ratio between bright and dark fringes is 3. Then the value of the ratio of amplitudes of the waves that arrive there is

\[ \frac{1}{\sqrt{3}} \quad \frac{\sqrt{3}+1}{\sqrt{3}-1} \quad \frac{\sqrt{3}-1}{\sqrt{3}+1} \quad \frac{\sqrt{3}}{1} \]

108. Work done in carrying an electric charge \( Q_1 \) once round a circle of radius \( R \) with a charge \( Q_2 \) at the centre of the circle is

\[ 0 \quad \frac{Q Q_2}{4\pi \varepsilon_0 R} \quad \infty \quad \frac{Q_1 Q_2}{4\pi \varepsilon_0 R^2} \]

109. The capacitance of two concentric spherical shells of radii \( R_1 \) and \( R_2 \) \((R_2 > R_1)\) is

\[ 4\pi \varepsilon_0 R_1 \quad 4\pi \varepsilon_0 R_2 \quad \frac{R_2 - R_1}{R_1 R_2} \quad \frac{R_2 R_1}{R_2 - R_1} \]

110. A wire of resistance 4 \( \Omega \) is stretched to twice its original length. In the process of stretching, its area of cross section gets halved. Now, the resistance of the wire is

\[ 4 \Omega \quad 8 \Omega \quad 16 \Omega \quad 1 \Omega \]

Rough Work
111. If in an amplitude modulated wave, the maximum amplitude is 10 Volts and the modulation index is 2/3, then the minimum amplitude is (in Volts)

| (1) | 2 |
| (2) | 7 |
| (3) | 9 |
| (4) | 6 |

112. The truth tables of logic gates (A, B, C, D) are given here. Identify them correctly

(A) | Input | Output |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td>0</td>
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<td>1</td>
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(B) | Input | Output |
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<tr>
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<tr>
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<td>1</td>
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(C) | Input | Output |
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<tr>
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<td>0</td>
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<td>1</td>
<td>0</td>
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</table>

(D) | Input | Output |
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<th></th>
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</thead>
<tbody>
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<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

(1) (A) — OR  
(B) — NOR  
(C) — NAND  
(D) — AND  
(2) (A) — OR  
(B) — AND  
(C) — NAND  
(D) — OR  
(3) (A) — OR  
(B) — NOR  
(C) — AND  
(D) — NAND  
(4) (A) — AND  
(B) — OR  
(C) — NAND  
(D) — NOR
113. For the action of a CE transistor, (E = emitter, B = base, C = collector) the required CB, EB junction bias conditions are
(1) EB junction — reverse bias
   CB junction — forward bias
(2) Both EB and CB junctions — forward bias
(3) Both EB and CB junctions — reverse bias
(4) EB junction — forward bias
   CB junction — reverse bias

114. The nuclear fusion reaction between deuterium and titrium takes place
(1) at ordinary temperature and pressure
(2) at low temperature and low pressure
(3) at very high temperature and very high pressure
(4) when the temperature is near absolute zero

115. If the wavelength of light that is emitted from Hydrogen atom when an electron falls from orbit \( n = 2 \) to orbit \( n = 1 \) is 122 nm, then minimum wavelength of the series is
\[ \frac{1}{n_f^2} = \frac{1}{n_i^2} - \frac{1}{n_f^2} \]
(1) 405 Å   (2) 9150 Å   (3) 812 Å   (4) 915 Å
116. When monochromatic light falls on a photosensitive material, the number of photoelectrons emitted per second is \( n \) and their maximum kinetic energy is \( K_{\text{max}} \). If the intensity of incident light is doubled, then

1. both \( n \) and \( K_{\text{max}} \) are halved
2. \( n \) is doubled but \( K_{\text{max}} \) remains same
3. \( K_{\text{max}} \) is doubled but \( n \) remains same
4. both \( n \) and \( K_{\text{max}} \) are doubled

117. A plane electromagnetic wave travels in free space. Then the ratio of the magnitudes of electric and magnetic fields at a point is equal to

1. Energy of electromagnetic wave
2. Inverse of the velocity of the electromagnetic wave
3. Inverse of the energy of electromagnetic wave
4. Velocity of electromagnetic wave

Rough Work
118. An alternating emf given by equation $E = 300 \sin (100\pi t)$ volt is applied to a resistance of 100 ohms. The rms current through the circuit is (in Amperes)

$$E = 300 \sin (100\pi t)$$

The maximum current is $I_m = \frac{E}{R}$

$$I_m = \frac{300}{100} = 3\ A$$

rms current is $I_{rms} = \frac{I_m}{\sqrt{2}}$

$$I_{rms} = \frac{3}{\sqrt{2}} A$$

(1) $\frac{6}{\sqrt{2}}$ (2) $\frac{3}{\sqrt{2}}$ (3) $\frac{9}{\sqrt{2}}$ (4) 3

119. The magnetic susceptibility of a material of a rod is 299. Permeability of vacuum ($\mu_0$) is $4\pi \times 10^{-7}$ H m$^{-1}$. Absolute permeability of the material of the rod is

$$\chi = \frac{\mu}{\mu_0}$$

(1) $3771 \times 10^{-8}$ H m$^{-1}$ (2) $3771 \times 10^{-7}$ H m$^{-1}$

(3) $3771 \times 10^{-5}$ H m$^{-1}$ (4) $3770 \times 10^{-6}$ H m$^{-1}$

120. A paramagnetic sample shows a net magnetization of 0.8 A/m, when placed in an external magnetic field of strength 0.8 T at a temperature 5 K. When the same sample is placed in an external magnetic field of 0.4 T at a temperature of 20 K, the magnetization is

$$M = \chi B$$

(1) 0.1 Am$^{-1}$ (2) 0.8 Am$^{-1}$ (3) 0.8 Am$^{-2}$ (4) 0.1 Am

Rough Work
121. The mole fraction of water in 98% (w/w) $\text{H}_2\text{SO}_4$ solution is

<table>
<thead>
<tr>
<th>Option</th>
<th>Mole Fraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.02</td>
</tr>
<tr>
<td>(2)</td>
<td>0.1</td>
</tr>
<tr>
<td>(3)</td>
<td>0.9</td>
</tr>
<tr>
<td>(4)</td>
<td>0.8</td>
</tr>
</tbody>
</table>

122. The reduction potential of hydrogen electrode at pH 10 is

<table>
<thead>
<tr>
<th>Option</th>
<th>Potential (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>0.0</td>
</tr>
<tr>
<td>(2)</td>
<td>-0.059</td>
</tr>
<tr>
<td>(3)</td>
<td>-0.59</td>
</tr>
<tr>
<td>(4)</td>
<td>0.59</td>
</tr>
</tbody>
</table>

123. The half-life of a first order reaction is 100 seconds at 280 K. If the temperature coefficient is 3.0, its rate constant at 290 K in s$^{-1}$ is

<table>
<thead>
<tr>
<th>Option</th>
<th>Rate Constant (s$^{-1}$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>$6.93 \times 10^{-2}$</td>
</tr>
<tr>
<td>(2)</td>
<td>$2.08 \times 10^{-3}$</td>
</tr>
<tr>
<td>(3)</td>
<td>$2.08 \times 10^{-2}$</td>
</tr>
<tr>
<td>(4)</td>
<td>$6.93 \times 10^{-3}$</td>
</tr>
</tbody>
</table>

124. Which one of the following forms a negatively charged sol?

<table>
<thead>
<tr>
<th>Option</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Cds</td>
</tr>
<tr>
<td>(2)</td>
<td>$\text{Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$</td>
</tr>
<tr>
<td>(3)</td>
<td>$\text{Cr}_2\text{O}_3 \cdot \text{H}_2\text{O}$</td>
</tr>
<tr>
<td>(4)</td>
<td>$\text{TiO}_2$</td>
</tr>
</tbody>
</table>

125. Which one of the following methods is used in the concentration of sulphide ore?

<table>
<thead>
<tr>
<th>Option</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Leaching</td>
</tr>
<tr>
<td>(2)</td>
<td>Froth floatation</td>
</tr>
<tr>
<td>(3)</td>
<td>Smelting</td>
</tr>
<tr>
<td>(4)</td>
<td>Roasting</td>
</tr>
</tbody>
</table>

Rough Work
126. The correct arrangement of following acids of phosphorus in the increasing order of oxidation state of phosphorus is
(1) pyrophosphoric acid < orthophosphorous acid < hypophosphorous acid
(2) hypophosphorous acid < orthophosphorous acid < pyrophosphoric acid
(3) hypophosphorous acid < pyrophosphoric acid < orthophosphorous acid
(4) pyrophosphoric acid < hypophosphorous acid < orthophosphorous acid

127. Among the following inert gas elements, the element that shows highest chemical reactivity is
(1) Xe (2) Ne (3) Ar (4) He

128. Crystal field theory does not explain which of the following property of coordination compounds?
(1) structure of coordination compounds
(2) the covalent character of the bond between metal and the ligand
(3) magnetic property
(4) colour

Rough Work
129. In \([\text{CoF}_6]^{3-}\), Co\(^{3+}\) uses outer d orbitals (4d) in sp\(^3\)d\(^2\) hybridisation. The number of unpaired electrons present in complex ion is
\([\text{CoF}_6]^{3-}\) కు కోటి ఆహారాలు (4d) చే స్పినాలు అందిస్తాయి. ఇదితో ఉన్నాను అనే సమస్య కొనిపిస్తుంది.

(1) 3
(2) 0
(3) 4
(4) 2

130. Identify from the following, the monomers which undergo condensation polymerisation
అమీరికి వినికల్పించడానికి ఉండే మొమ్మెర్లను ప్రతిరోజు నిస్తారం అయించండి.

1. \(\text{H}_2\text{C}=\text{CH}–\text{CH}=\text{CH}_2\)

2.

\[
\begin{align*}
\text{CO}_2\text{H} \\
\text{CO}_2\text{H}
\end{align*}
\]

3. \(\text{H}_2\text{C}–\text{CHCl}\)

4. \[
\begin{align*}
\text{NH} \\
\text{NH}
\end{align*}
\]

5. \(\text{F}_2\text{C}–\text{CF}_2\)

6. \((\text{H}_3\text{C})_2\text{C}–\text{CH}_2\)

(1) 2, 4
(2) 3, 5
(3) 1, 3
(4) 1, 6
131. Which one of the following sets of vitamins is fat-soluble?

(ఒకటి మాత్రమే తేలంపాల విటమిన్స్ ఉంది?

(I) D, B₁, B₂, E
(2) C, D, B₆, B₁₂
(3) A, D, E, K
(4) A, D, B₁, B₂

132. Match the following

<table>
<thead>
<tr>
<th>List-I</th>
<th>List-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Sucralose</td>
<td>(I) Antioxidant</td>
</tr>
<tr>
<td>(B) Iodine</td>
<td>(II) Artificial sweetener</td>
</tr>
<tr>
<td>(C) Sodium benzoate</td>
<td>(III) Antacid</td>
</tr>
<tr>
<td>(D) Ranitidine</td>
<td>(IV) Antiseptic</td>
</tr>
<tr>
<td></td>
<td>(V) Food preservative</td>
</tr>
</tbody>
</table>

మాటలు-I

| (A) సంక్షిప్తుడు          | (I) మారుద పాయింట్స్     |
| (B) రెడ్డీ          | (II) వ్యాయామం వస్తుంది |
| (C) సాలీడు సూపర్స్రీట్ | (III) వాంటి రోగాలు   |
| (D) వాణిజ్యం               | (IV) పండిత్తును మనిషి వస్తుంది |

(V) భారీ ఎందుకంటే వస్తుంది

The correct answer is

(A) (B) (C) (D)

(1) (II) (I) (III) (IV)
(2) (II) (IV) (I) (III)
(3) (II) (IV) (V) (III)
(4) (II) (III) (V) (I)

Rough Work
133. What is the name of the following reaction?

\[ \text{CH}_3\text{CH}_2\text{CH}_2\text{Br} \xrightarrow{\text{Nal}} \text{CH}_3\text{CH}_2\text{Br} \xrightarrow{\text{dry acetone}} \text{CH}_3\text{CH}_2\text{CH}_2\text{I} \]

(1) Swarts Reaction  
(2) Sandmeyer Reaction  
(3) Gatterman Reaction  
(4) Finkelstein Reaction

\[ \text{CH}_3\text{CH}_2\text{CH}_2\text{Br} \xrightarrow{\text{Nal}} \text{CH}_3\text{CH}_2\text{CH}_2\text{I} \]

(1) \( \text{H} \)  
(2) \( \text{Br} \)  
(3) \( \text{Na} \)  
(4) \( \text{I} \)

134. \( Y \xrightarrow{\text{Na}} X \xrightarrow{\text{Conc. H}_2\text{SO}_4, 413 K} (\text{C}_2\text{H}_5)_2\text{O} \)

What are \( X \) and \( Y \) in the above reactions?

\[ Y \xrightarrow{\text{Na}} X \xrightarrow{\text{Conc. H}_2\text{SO}_4, 413 K} (\text{C}_2\text{H}_5)_2\text{O} \]

 hogy \( X \) \( Y \) ఉన్నాయి?

\( X \) \( Y \)

(1) \( \text{C}_2\text{H}_5\text{OH} \)  
(2) \( \text{C}_3\text{H}_7\text{ONa} \)  
(3) \( \text{H}_3\text{COH} \)  
(4) \( \text{C}_4\text{H}_9\text{ONa} \)  
(5) \( \text{C}_2\text{H}_5\text{OH} \)  
(6) \( \text{C}_2\text{H}_5\text{ONa} \)

135. Which one of the following methods can be used to separate a mixture of \textit{ortho-} and \textit{para-} nitrophenols?

(1) Steam distillation  
(2) Crystallization  
(3) Solubility  
(4) Sublimation

ఒర్ధ్ధం లేదా పారా నిట్రోఫెనోళ్స్ మాత్రమే విభజించడానికి మేల్సిన పద్ధతి ఎది?

(1) స్టీమ్ డిస్టిలేషన్  
(2) క్రస్టలైజాషన్  
(3) సోలబిలిటీ  
(4) స్బలిమేషన్
136. Acetaldehyde undergoes reaction in the presence of dil. NaOH to give ________

(1) 3-Hydroxy butanal
(2) Ethyl acetate
(3) Butanoic acid
(4) Acetic acid

137. Identify the compounds from the following which form primary amines under suitable reduction conditions

1. C\textsubscript{2}H\textsubscript{5}NC
2. C\textsubscript{2}H\textsubscript{6}
3. C\textsubscript{2}H\textsubscript{5}CONH\textsubscript{2}
4. C\textsubscript{6}H\textsubscript{5}NO\textsubscript{2}

(1) 2, 3, 4  (2) 1, 4  (3) 3, 4  (4) 1, 3, 4

138. Assertion (A) : \( \Delta U = 0 \) for a reversible as well as irreversible expansion of an ideal gas under isothermal conditions, whereas \( \Delta S_{\text{total}} \neq 0 \) for an irreversible process.

Reason (R) : \( \Delta U \) is independent of temperature whereas \( \Delta S \) is proportional to temperature.

The correct answer is

(1) (A) and (R) are correct, (R) is not the correct explanation of (A).
(2) (A) is correct, but (R) is not correct.
(3) (A) is not correct, but (R) is correct.
(4) (A) and (R) are correct, (R) is the correct explanation of (A).

139. Assertion (A) : \( \Delta S_{\text{total}} \neq 0 \) for a reversible operation of an ideal gas under isothermal conditions, whereas \( \Delta S_{\text{total}} = 0 \) for an irreversible process.

Reason (R) : \( \Delta S_{\text{total}} \) is independent of temperature whereas \( \Delta S \) is proportional to temperature.

The correct answer is

(1) (A) is correct, (R) is correct.
(2) (A) is correct, (R) is not correct.
(3) (A) is not correct, (R) is correct.
(4) (A) and (R) are correct, (R) is the correct explanation of (A).

Rough Work
139. When 0.1 moles of \( \text{N}_2\text{O}_4 \) was placed in a 1.0 litre flask at 400 K and closed, the following equilibrium is reached with a total pressure of 6 bar.

\[
\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2
\]

Assuming ideal behaviour of the gases, the partial pressure of \( \text{N}_2\text{O}_4 \) at equilibrium in bar is \( (R = 0.083 \text{ bar L mol}^{-1} \text{ K}^{-1}) \)

1.0 कीलोमुर्त में 0.1 मोल \( \text{N}_2\text{O}_4 \) को 400 K के स्थान से बंद किया जाता है, तो मनमानीकरण उत्पन्न होता है।

\[
\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2
\]

किसी स्थिति में विस्तृत वायुमंडल, विशेषकर \( \text{N}_2\text{O}_4 \) की द्रव्यता के साथ अनुपात barों में \( (R = 0.083 \text{ bar L mol}^{-1} \text{ K}^{-1}) \)

(1) 2.68 (2) 3.32 (3) 9.32 (4) 0.64

140. A saturated solution of \( \text{Ca}_3(\text{PO}_4)_2 \) contains \( 2.0 \times 10^{-8} \text{ M} \) of \( \text{Ca}^{2+} \) and \( 1.6 \times 10^{-5} \text{ M} \) of \( \text{PO}_4^{3-} \) at a certain temperature. The solubility product \( (K_{sp}) \) of \( \text{Ca}_3(\text{PO}_4)_2 \) at that temperature is \( 8.00 \times 10^{-34} \text{ M} \) at 1.6 \( \times 10^{-5} \text{ M} \) \( \text{PO}_4^{3-} \) रक्षक 8.00 \( \times 10^{-34} \) में।

(1) \( 8.00 \times 10^{-34} \) (2) \( 2.048 \times 10^{-34} \) (3) \( 2.048 \times 10^{-33} \) (4) \( 3.20 \times 10^{-34} \)

141. In which of the following reactions, \( \text{H}_2\text{O}_2 \) acts as a reducing reagent?

\( \text{H}_2\text{O}_2 \) किस रेती में कार्य करता है?

(1) \( \text{PbS(s)} + 4\text{H}_2\text{O}_2(\text{aq}) \xrightleftharpoons{H^+} \text{PbSO}_4(\text{s}) + 4\text{H}_2\text{O(l)} \)

(2) \( \text{HOCI} + \text{H}_2\text{O}_2 \xrightarrow{H^+} \text{H}_3\text{O}^+ + \text{Cl}^- + \text{O}_2 \)

(3) \( \text{Mn}^{2+} + \text{H}_2\text{O}_2 \xrightarrow{\text{OH}^-} \text{Mn}^{4+} + 2\text{OH}^- \)

(4) \( 2\text{Fe}^{2+} + \text{H}_2\text{O}_2 \xrightarrow{\text{OH}^-} 2\text{Fe}^{3+} + 2\text{OH}^- \)

Rough Work

AM 2014 B 55 R
142. The decreasing order of hydration enthalpies of alkaline earth metal ions is

\[(1) \, \text{Be}^{2+} > \text{Mg}^{2+} > \text{Ca}^{2+} > \text{Sr}^{2+} > \text{Ba}^{2+}\] 

\[(2) \, \text{Be}^{2+} > \text{Ba}^{2+} > \text{Mg}^{2+} > \text{Ca}^{2+} > \text{Sr}^{2+}\] 

\[(3) \, \text{Ba}^{2+} > \text{Sr}^{2+} > \text{Ca}^{2+} > \text{Mg}^{2+} > \text{Be}^{2+}\] 

\[(4) \, \text{Be}^{2+} > \text{Ca}^{2+} > \text{Sr}^{2+} > \text{Mg}^{2+} > \text{Ba}^{2+}\] 

143. The correct increasing order of the stability of Al$^+$, Ga$^+$, In$^+$, Ti$^+$ ions is

\[\text{Al}^+, \text{Ga}^+, \text{In}^+, \text{Ti}^+\] 

\[(1) \, \text{Ti}^+ < \text{Al}^+ < \text{Ga}^+ < \text{In}^+\] 

\[(2) \, \text{Al}^+ < \text{Ga}^+ < \text{Ti}^+ < \text{In}^+\] 

\[(3) \, \text{Al}^+ < \text{Ga}^+ < \text{In}^+ < \text{Ti}^+\] 

\[(4) \, \text{Ti}^+ < \text{In}^+ < \text{Ga}^+ < \text{Al}^+\] 

144. Which of the following is used as black pigment in black ink?

\[(1) \, \text{coke} \quad (2) \, \text{carbon black} \quad (3) \, \text{germanium} \quad (4) \, \text{graphite} \] 

145. Which one of the following sets contribute to the global warming?

\[\text{H}_2, \text{NO}_2, \text{SO}_2 \quad (2) \, \text{SO}_2, \text{SO}_3, \text{O}_2 \quad (3) \, \text{N}_2, \text{C}_2\text{H}_6, \text{SO}_3 \quad (4) \, \text{CO}_2, \text{CH}_4, \text{CFCs}\] 

146. In the estimation of halogen, 0.18 g of an organic compound gave 0.12 g of silver bromide.

What is the percentage of bromine in the compound? (Molar mass of AgBr = 188; Atomic weight of Br = 80)

\[\text{The molar mass of the compound is 0.18 g of compound gives 0.12 g of AgBr. The molar mass is 80 g/mol. The molar mass of Br is 80 g/mol.}\]

\[(1) \, 30.64 \quad (2) \, 35.24 \quad (3) \, 34.84 \quad (4) \, 28.36\] 

**Rough Work**
147. C-H and C-C bond lengths (in pm) in ethane are

(1) 100, 154  (2) 133, 154  (3) 110, 136  (4) 112, 154

148. What are Y and Z in the following reaction sequence?

\[
\begin{align*}
\text{CH}_2 = \text{CHBr} & \xrightarrow{\text{NaNH}_2} Y & \xrightarrow{\text{Hg}^{2+}/\text{H}^+} Z \\
& & \xrightarrow{\text{H}_2\text{O}, \text{333 K}} \\
Y & & Z
\end{align*}
\]

(1) ethane, ethanol 
(2) ethyne, acetic acid 
(3) ethyne, ethanal 
(4) ethylamine, ethanal

What is the Y and Z?

\[
\begin{align*}
\text{CH}_2 = \text{CHBr} & \xrightarrow{\text{NaNH}_2} Y & \xrightarrow{\text{Hg}^{2+}/\text{H}^+} Z \\
& & \xrightarrow{\text{H}_2\text{O}, \text{333 K}} \\
Y & & Z
\end{align*}
\]

(1) एथेन, एथनाल 
(2) एथन, अेसिकी एसिड 
(3) एथन, एथेनाल 
(4) एथिल एमीन, एथेनाल

149. The percentages of void space for simple cubic, body centred cubic and hexagonal close packed arrangements respectively are

(1) 32, 48, 26  (2) 48, 32, 26  (3) 48, 26, 32  (4) 26, 48, 32

Rough Work
150. van’t Hoff factor, \( i \), of a 0.5\% (w/w) aqueous solution of KCl which freezes at \(-0.24^\circ C\) is
\[
(K_f \text{ of water} = 1.86 \text{ K kg mol}^{-1}, \text{ Mol. wt. of KCl} = 74.5)
\]

\[0.5\% \text{ (w/w) KCl से} -0.24^\circ C \text{ तक ब्रेक्स होने} \text{ वाली तापमान} \text{ ज्ञात की (van't Hoff)}
\]
\[
(\text{यदि } K_f = 1.86 \text{ K kg mol}^{-1}, \text{ KCl मोलर भूमिका } = 74.5)
\]

(1) 1.32  
(2) 1.52  
(3) 2.32  
(4) 1.92

151. The wavelength in metres, of an object of mass 1.0 g moving with a velocity of \(1.0 \times 10^4 \text{ cm s}^{-1}\) is \((h = 6.626 \times 10^{-34} \text{ Js})\)
\[
1.0 \times 10^4 \text{ cm s}^{-1} \text{ वेग से}, 1.0 \text{ g मात्र होकर उसका} \text{ एक निर्णय} \text{ है (h = 6.626 \times 10^{-34} \text{ Js})}
\]

(1) \(6.626 \times 10^{-27}\)  
(2) \(6.626 \times 10^{-26}\)  
(3) \(6.626 \times 10^{-31}\)  
(4) \(6.626 \times 10^{-33}\)

152. The ratio of ground state energy of Li\(^{2+}\), He\(^+\) and H is
\[
\text{Li}^{2+}, \text{He}^+ \text{ और H के गर्दन स्थिति} \text{ ऊर्जा} \text{ का} \text{ अनुपात है}
\]

(1) 9:4:1  
(2) 1:2:3  
(3) 3:2:1  
(4) 1:4:9

153. Elements A, B and C belong to the same period in the long form of the periodic table. The nature of the oxides of A, B and C is amphoteric, basic and acidic respectively. The correct order of the atomic numbers of these elements is
\[
\text{A, B, C} \text{ और तुरंत} \text{ अनुसार} \text{ इनके कार्बनेट} \text{ के} \text{ धातुयता} \text{ की} \text{ वेगुळ} \text{ है. A, B, C} \text{ के} \text{ एक} \text{ तुरंत} \text{ अनुसार} \text{ वाक्येश} \text{ की} \text{ ऊर्जा} \text{ का} \text{ अनुपात है}
\]

(1) B > A > C  
(2) C > B > A  
(3) C > A > B  
(4) A > B > C

Rough Work

AM 2014 B  
58 R
154. Which one of the following is the correct order of the size of the ions?

(1) \( O^{2-} > F^- > Mg^{2+} > Na^+ \)  
(2) \( Na^+ > Mg^{2+} > F^- > O^{2-} \)  
(3) \( O^{2-} > F^- > Na^+ > Mg^{2+} \)  
(4) \( Mg^{2+} > Na^+ > F^- > O^{2-} \)

155. If \( E \) = the number of lone pairs of electrons on \( Xe \),
     \( B \) = the number of bonding pairs of electrons,
     \( S \) = shape of the molecule,
then, what is the correct set of \( E, B \) and \( S \) of \( XeF_4 \) ?

\( E = Xe \)  
\( B \) = bond pairs of electrons,
\( S \) = shape of the molecule.

\( XeF_4 \) on \( E, B, S \)  

\[\begin{array}{ccc}
E & B & S \\
(1) & 4 & 2 \text{ square planar (తాపశీల రేఖాయం)} \\
(2) & 3 & 3 \text{ octahedral (పల్లు సంపాద)} \\
(3) & 3 & 3 \text{ square planar (తాపశీల రేఖాయం)} \\
(4) & 2 & 4 \text{ square planar (తాపశీల రేఖాయం)}
\end{array}\]
156. In the molecule, the formal charges of oxygen atoms 1, 2, 3 are respectively

(1) −1, 0, +1  (2) 0, −1, +1  (3) 0, +1, −1  (4) +1, 0, −1

157. If 240 mL of a gas X diffuses through a porous membrane in 20 min whereas the same volume of methane diffuses in 10 min at the same temperature and pressure, the molar mass in g mol⁻¹ of gas X is.

(1) 128  (2) 8  (3) 64  (4) 32

158. The rms speed of helium in ms⁻¹ (atomic mass = 4.0 g mol⁻¹) at 400 K is

400 K నుంచి ఇలెనం రేగాను (అట్టికుల భాగం = 4.0 g mol⁻¹) రమ్బస్ ఎంటమైన ms⁻¹ ఉంది.

(1) 1580  (2) 15.8  (3) 28  (4) 158

Rough Work
159. In a closed vessel, 5 moles of $A_2(g)$ and 7 moles of $B_2(g)$ are reacted in the following manner

$$A_2(g) + 3B_2(g) \rightarrow 2AB_3(g).$$

What is the total number of moles of gases present in the container at the end of the reaction?

$$A_2(g) + 3B_2(g) \rightarrow 2AB_3(g).$$

(1) $\frac{8}{3}$  
(2) $\frac{22}{3}$  
(3) $\frac{7}{3}$  
(4) $\frac{14}{3}$

160. Observe the following reaction

$$2NO_2(g) + 2OH^-(aq) \rightarrow NO_2^-(aq) + NO_3^-(aq) + H_2O(l)$$

In this reaction,

(1) $NO_2(g)$ is reduced to $NO_2^-(aq)$ and oxidized to $NO_3^-(aq)$
(2) $OH^-$ is oxidized to $H_2O$
(3) $OH^-$ is reduced to $H_2O$
(4) $NO_2(g)$ is reduced to $NO_2^-(aq)$ and oxidized to $NO_3^-(aq)$

$$2NO_2(g) + 2OH^-(aq) \rightarrow NO_2^-(aq) + NO_3^-(aq) + H_2O(l)$$

(1) $NO_2(g)$, $NO_3^-(aq)$, $NO_2^-(aq)$, $NO_2^-(aq)$, $NO_3^-(aq)$
(2) $OH^-$, $H_2O$ to $H_2O$
(3) $OH^-$, $H_2O$ to $H_2O$
(4) $NO_2(g)$, $NO_2^-(aq)$, $H_2O$, $H_2O$, $H_2O$