



NEET GRAND TEST-6

Name :..... Hall Ticket No:

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1. The Model **NEET- 2019** is of **3 Hrs** duration. **Time: 10.00 AM - 1.00 PM.**
2. The question paper for NEET-2019 consists of 180 questions comprising 45 questions in Botany, 45 in Zoology, 45 in Physics and 45 in Chemistry for NEET.
3. All questions are of objective type (Multiple choices only)
4. Each question carries four marks.
5. Negative marking: one mark will be deducted for every wrongly answered question.
6. Total Marks 720.
7. The candidates are prohibited from carrying any paper to the examination hall except **HALL TICKET**.
8. No Calculators, Mini-Cards, Watches with Calculators, Pager, Cell Phone, Slide rules or outer aids to calculation will be allowed in the examination hall.
9. Candidates once admitted will not be allowed to leave the hall till half an hour before the closing of the test.
10. A separate sheet is attached in the middle of this booklet for rough work, you can detach and use it.
11. A detachable answer sheet with 180 question blocks, with 4 circles corresponding to 4 multiple choice for each question will be provided. Use HB Pencil to darken the appropriate circle against the question number provided in the sheet. Answer should be marked only on the answer sheet, but not on the question paper booklet.



SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA.

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SEC : SR ELITE, AIIMS S60, NEET MPL & MEDICON

DATE : 02-02-19

Sub: BIOLOGY

NEET GRAND TEST- 6

Max.Marks: 720

1. Adventitious roots, green sporophylls, stele and heterospores are observed for first time in

- (1) Mosses
- (2) Pteridophytes
- (3) Algae
- (4) Fungi

2. What is the aestivation in corolla with one standard petal, wing petals and keel petals ?

- (1) Valvate aestivation
- (2) Twisted aestivation
- (3) Imbricate aestivation
- (4) Vexillary aestivation

3. Marine, biflagellated, mesokaryotic phyto planktons are

- (1) Slime moulds
- (2) Protozoans
- (3) Dinoflagellates
- (4) Euglenoids

4. Pioneers in plant succession that begins on a bare rock belong to a kingdom ____ in Whittaker's classification

- (1) Plantae
- (2) Fungi
- (3) Monera
- (4) None of the above

5. Unisexuality in the sporophyte and unisexuality in gametophyte (respectively) is observed in

- (1) *Cycas*, *Marchantia*
- (2) *Mango*, *Cycas*
- (3) *Pinus*, *Marchantia*
- (4) *Marchantia*, *Funaria*

6. Match the items given in Column I with those in Column II and select the *correct* option given below:

Column I

Column II

- | | |
|---------------------|---|
| a. Follicular phase | i. 1 st -5 th day |
| b. Secretory phase | ii. 6 th -13 th day |
| c. Menstrual phase | iii. 15 th -28 th day |
| d. Ovulation | iv. 14 th day |

a	b	c	d
----------	----------	----------	----------

- | | | | | |
|-----|-----|-----|-----|----|
| (1) | iii | ii | i | iv |
| (2) | ii | iii | iv | i |
| (3) | i | ii | iii | iv |
| (4) | ii | iii | i | iv |

7. Match the items given in Column I with those in Column II and select the *correct* option given below :

Column I

Column II

- | | |
|---------------------------------|-------------|
| a. Inspiratory capacity | i. IC+FRC |
| b. Vital capacity | ii. TV+IRV |
| c. Functional residual capacity | iii. TLC-RV |
| d. Total lung capacity | iv. ERV+RV |

a	b	c	d
----------	----------	----------	----------

- | | | | | |
|-----|-----|-----|----|----|
| (1) | iii | ii | iv | i |
| (2) | ii | iii | i | iv |
| (3) | ii | iii | iv | i |
| (4) | iv | iii | ii | i |

8. Biological oxygen demand (BOD) indicates the
- (1) Amount of inorganic mater in water
 - (2) Turbidity of water
 - (3) Amount of organic matter in water
 - (4) Salinity of water
9. The difference between primary follicle and secondary follicle in the human ovary is
- (1) The primary follicle contains the primary oocyte whereas the secondary follicle contains the secondary oocyte
 - (2) The primary follicle contains an oocyte and one polar body whereas the secondary follicle contains an oocyte and two polar bodies
 - (3) The oocyte in the primary follicle is diploid whereas the oocyte in the secondary follicle is haploid
 - (4) In the primary follicle the oocyte is surrounded by a single layer of cells whereas in the secondary follicle the oocyte is surrounded by several layers of granulosa cells
10. Wood is decomposed slowly in nature due to high content of
- (1) Nitrogen
 - (2) Moisture
 - (3) Lignin
 - (4) Oxygen
11. Acropetal arrangement is observed in all except
- (1) Lateral roots
 - (2) Leaves
 - (3) Flowers in cymose inflorescence
 - (4) Flowers in racemose inflorescence
12. Which genus in fungi produces both exospores and endospores ?
- (1) *Penicillium*
 - (2) *Albugo*
 - (3) *Alternaria*
 - (4) *Ustilago*
13. Female gametophyte in angiosperms is
- (1) 3 celled & parasitic
 - (2) 7 celled & green
 - (3) 8 celled & green
 - (4) 7 celled & parasitic
14. Simple tissue absent in monocots is
- (1) Sclerenchyma
 - (2) Parenchyma
 - (3) Collenchyma
 - (4) Sieve tubes
15. Bark excludes
- (1) Phellem
 - (2) Periderm
 - (3) Bast
 - (4) Wood
16. Match the items given in Column I with those in Column II and select the *correct* option given below:
- | <i>Column I</i> | <i>Column II</i> |
|--------------------|------------------------------|
| a. Ketonuria | i. Autosomal recessive trait |
| b. Phenylketonuria | ii. Diabetes insipidus |
| c. Polyuria | iii. Glomerular nephritis |
| d. Proteinuria | iv. Diabetes mellitus |
- | | a | b | c | d |
|-----|----------|----------|----------|----------|
| (1) | ii | i | iv | iii |
| (2) | iv | iii | ii | i |
| (3) | i | iv | iii | ii |
| (4) | iv | i | ii | iii |

17. Match the items given in Column I with those in Column II and select the *correct* option given below:

<i>Column I</i>		<i>Column II</i>	
a. Ozone depletion	i. CO ₂		
b. Biomagnification	ii. CFC		
c. Greenhouse effect	iii. CO		
d. Catalytic converters	iv. DDT		

	a	b	c	d
(1)	ii	iv	iii	i
(2)	ii	iv	i	iii
(3)	iv	ii	i	iii
(4)	ii	iii	i	iv

18. Which of the following is an allergic disease of the lower respiratory tract?

- (1) Emphysema
- (2) Asthma
- (3) Hay fever
- (4) Pneumonia

19. Which of the following pairs is wrongly matched ?

- (1) Hb^AHb^S - Codominance
- (2) ZW type of sex determination - Grasshopper
- (3) VNTR - Satellite DNA
- (4) Human genome project - Bioinformatics

20. Exploring molecular, genetic and species level diversity for products of economic importance is termed

- (1) Bioprospecting
- (2) Biomagnification
- (3) Bioremediation
- (4) Biopiracy

21. Conduction of water in red wood tree is through

- (1) Tracheids
- (2) Vessels
- (3) Both tracheids and vessels
- (4) Sieve tube elements

22. Polynucleotides and polypeptides are building blocks in

- (1) Chromosome
- (2) Cell membrane
- (3) Viroid
- (4) Prion

23. The DNA content of a megaspore mother cell during G₂ phase would be _____ to that of megaspore

- (1) Four times
- (2) Half
- (3) Same
- (4) Double

24. The correct sequence of DNA packaging would be

- (1) DNA → Nucleosome → Chromatin fibre → Chromatid → Chromosome
- (2) DNA → Nucleosome → Chromatid → Chromosome → Chromatin fibre
- (3) Nucleosome → DNA → Chromatin fibre → Chromatid → Chromosome
- (4) Chromatin fibre → DNA → Nucleosome → Chromatid → Chromosome

25. Alkalinity is NOT a feature of/in

- (1) Gut of lepidopterans
- (2) Dyes for staining chromosomes
- (3) Optimum activity for lysosome enzymes
- (4) Guard cells of photoactive stoma during day

26. Match the items given in Column I with those in Column II and select the **correct** option given below:

Column I		Column II	
a. PCT		i. Reabsorption of water	
b. Descending limb of Henle's loop		ii. Reabsorption of water and electrolytes	
c. Bowman's capsule		iii. Reabsorption of electrolytes	
d. Ascending limb of Henle's loop		iv. Filtration	

	a	b	c	d
(1)	ii	i	iv	iii
(2)	ii	iii	iv	i
(3)	iv	i	ii	iii
(4)	iii	iv	i	ii

27. Which of the following radiation is almost completely absorbed, given that the ozone layer is intact?

- (1) UV - A
- (2) UV - B
- (3) UV - C
- (4) All UV rays

28. Which of the following options **correctly** represents the heart conditions in heart failure and heart attack, respectively ?

- (1) The heart stops beating; heart muscle is suddenly damaged by an inadequate blood supply
- (2) The heart is not pumping blood effectively; the heart stops beating
- (3) The heart is not pumping blood effectively; heart muscle is suddenly damaged by an inadequate blood supply
- (4) Acute chest pain when no enough oxygen is reaching the heart muscle; the heart stops beating

29. Identify the vertebrate group of animals characterized by four pairs of gills covered by an operculum on each side.

- (1) Osteichthyes
- (2) Chondrichthyes
- (3) Cyclostomata
- (4) Cephalochordata

30. Appearance of dry, scaly lesions on various parts of the body such as skin, nails and scalp are the main symptoms of

- (1) Elephantiasis
- (2) Ascariasis
- (3) Ringworm
- (4) Amoebiasis

31. The actual synthesis of protein occurs outside ____ of a cell eventhough the process is directed by _____ present inside it

- (1) Ribosome, Nucleus
- (2) Nucleus, DNA
- (3) Ribosome, DNA
- (4) Nucleus, mitochondria

32. A porin differs from a prion in being a

- (1) Ion channel
- (2) Protein
- (3) Infectious agent
- (4) Heteropolymer

33. Last step of ETS in "Z - scheme" of non cyclic electron transport is catalysed by

- (1) ATP synthetase
- (2) Fd-NADP reductase
- (3) Oxygen evolving complex
- (4) Cytochrome C oxidase

34. What is untrue with regard to the role of potassium ?
- (1) Opening & closing of stomata
 - (2) Protein synthesis
 - (3) Photolysis of water
 - (4) Anion - cation balance
35. A phenomenon NOT of universal occurrence in higher plants is
- (1) Guttation
 - (2) Transpiration
 - (3) Photosynthesis
 - (4) Exchange of gases
36. Which of the following hormones can play a role in erythropoiesis?
- (1) Thyroxine, cortisol
 - (2) Thyroxine, aldosterone
 - (3) Melatonin, thymosine
 - (4) Erythropoietin, ANP
37. International day for biological diversity is
- (1) 16th September
 - (2) 22nd May
 - (3) 22nd April
 - (4) 4th October
38. Which of the following features helps distinguish forewings of cockroach from hindwings?
- (1) They arise from prothorax
 - (2) They are transparent and membranous
 - (3) They are useful for flight
 - (4) They are opaque, dark and leathery
39. Cocaine is derived from which part of cocoa plant?
- (1) Leaves
 - (2) Flowers
 - (3) Latex
 - (4) Roots
40. Which of the following lacks a body cavity?
- (1) *Wuchereria*
 - (2) Planaria
 - (3) *Cucumaria*
 - (4) *Hirudinaria*
41. Which biological process occurs universally in all living organisms ?
- (1) Calvin cycle
 - (2) Krebs cycle
 - (3) EMP pathway
 - (4) Hatch & Slack cycle
42. The positive pressure that causes water to rise in plants is by
- (1) "Pull" of transpiration
 - (2) "Push" of root pressure
 - (3) "Pull & push" by root pressure
 - (4) "Push" by transpiration
43. Bolting hormone is
- (1) Gibberellin
 - (2) Auxin
 - (3) Cytokinins
 - (4) ABA
44. How many of the following characters apply to C₄ plants ?
Krantz anatomy, scotoactive stoma, minimum /no photorespiration, dimorphic chloroplasts, minimum water loss and temperate habitat
- (1) 5
 - (2) 4
 - (3) 2
 - (4) 3
45. A pair of these compounds of aerobic respiration are non isomeric. What are they ?
- (1) DHAP & PGAL
 - (2) Acetyl Co.A & Succinyl Co.A
 - (3) 3 PGA & 2 PGA
 - (4) Glucose 6 P & Fructose 6P

46. All of the following enzymes catalyze the digestion of DNA into nitrogen bases and pentose sugars except

- (1) Nuclease
- (2) Nucleotidase
- (3) Nucleosidase
- (4) DNA ligase

47. Match the items given in Column I with those in Column II and select the *correct* option given below:

<i>Column I</i>		<i>Column II</i>	
a. Diaphragm	i. Contraceptive pill		
b. LNG-20	ii. Barrier method		
c. Saheli	iii. Intrauterine device		
d. Vasectomy	iv. Sterilisation		

- | | a | b | c | d |
|-----|----------|----------|----------|----------|
| (1) | ii | iii | i | iv |
| (2) | iii | ii | i | iv |
| (3) | ii | iii | iv | i |
| (4) | i | ii | iii | iv |

48. Darwinian variations are

- (1) Saltations
- (2) Directional
- (3) Large
- (4) Sudden

49. Congenital enterokinase deficiency in a well-fed child is most likely to cause which disorder among the following?

- (1) Marasmus
- (2) Gastric ulcers
- (3) Jaundice
- (4) Kwashiorkor

50. Emigration refers to the number of _____ during a given period of time.

- (1) Births in a population
- (2) Individuals of the same species leaving the habitat
- (3) Deaths in a population
- (4) Individuals of the same species entering the habitat

51. Gametophytic tissue but not the gamete, has a role in endosperm formation in

- (1) *Ficus*
- (2) *Cycas*
- (3) Coconut
- (4) Castor

52. What is the formation of embryo without fertilization and reduction division called?

- (1) Polyembryony
- (2) Parthenocarp
- (3) Parthenogenesis
- (4) Amphimixis

53. The buds on leaves bears the fore runners of clones in

- (1) Potato
- (2) *Bryophyllum*
- (3) Strawberry
- (4) Onion

54. A dicot with oily endosperm in its seed is

- (1) *Cocos*
- (2) Groundnut
- (3) Sunflower
- (4) Castor

55. Four types of gametes are produced by plants with following genotypes

- I) AaBb
- II) RrYy
- III) AA BbCc
- IV) Tt RR Ww

- (1) I & II
- (2) II & IV
- (3) I, II, IV
- (4) All the above

56. Which of the following is *not* an autoimmune disease?
- (1) Alkaptonuria
 - (2) Myasthenia gravis
 - (3) Hashimoto disease
 - (4) Multiple sclerosis
57. Which of the following animals does not undergo ecdysis?
- (1) *Bungarus*
 - (2) *Ascaris*
 - (3) *Aedes*
 - (4) *Nereis*
58. The diameter of the pupil is regulated by
- (1) Ligaments attached to the ciliary body
 - (2) Striated muscle fibres of the iris
 - (3) Smooth muscle fibres of the ciliary body
 - (4) Smooth muscle fibres of the iris
59. Allantois of mammalian embryo is derived from
- (1) Ectoderm and somatic mesoderm
 - (2) Ectoderm and splanchnic mesoderm
 - (3) Endoderm and somatic mesoderm
 - (4) Endoderm and splanchnic mesoderm
60. Which of the following is a secondary pollutant ?
- (1) MIC
 - (2) DDT
 - (3) PAN
 - (4) CFC
61. In F_2 population of 1600 plants, number of plants with *Yyrr* genotype are
- (1) 150
 - (2) 300
 - (3) 200
 - (4) 400
62. Which one among the following is transcribed but not translated ?
- (1) Promoter
 - (2) Exon
 - (3) Intron
 - (4) Junk DNA
63. 5 methyl uracil is present in
- (1) DNA
 - (2) t RNA
 - (3) m RNA
 - (4) 2 & 3
64. What is NOT true about t RNA ?
- (1) Adaptor molecule
 - (2) Clover leaf like secondary structure
 - (3) Possess codons
 - (4) Interpret genetic code
65. What is the membrane embedded transporter that brings lactose into the cell of *Escherichia coli* ?
- (1) Aquaporin
 - (2) β -galactosidase
 - (3) Trans acetylase
 - (4) Permease
66. Which one of the following shows a very close relationship between fungi and higher plants where neither of the two can survive in the absence of the other?
- (1) Lichens
 - (2) Mycorrhizae
 - (3) Zoochlorellae
 - (4) Corallorhiza
67. Which of the following is secreted by the pituitary gland?
- (1) Somatostatin
 - (2) Somatomedin
 - (3) Somatotropin
 - (4) Somatocrinin

68. "In recent years, ex-situ conservation has advanced beyond keeping threatened species in enclosures". Which of the following supports this statement?

- (1) Zoological park
- (2) Biodiversity hotspot
- (3) Sacred grove
- (4) Cryopreservation

69. Prototherians differ from all other mammals by the

- (1) Presence of pinna
- (2) Presence of a cloaca
- (3) Absence of mammary glands
- (4) Absence of diaphragm

70. Drones of honeybees are produced by

- (1) Parthenocarpy
- (2) Paedogenesis
- (3) Syngamy
- (4) Parthenogenesis

71. Match the following lists

List - I	List - II
A) 200bp of DNA helix	I) DNA in a typical mammalian cell
B) 2000bp/sec	II) Typical nucleosome
C) 20 A°	III) Rate of polymerization in <i>E.coli</i>
D) 2.2 metres	IV) Width of DNA

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

72. Radioactive isotopes were used successfully in the landmark discoveries by all these scientists except

- (1) Hershey & Chase
- (2) Messelson & Stahl
- (3) Calvin & Bashham

(4) Taylor *et al*

73. Synthesis of cDNA is catalysed by

- (1) DNA dependant DNA polymerase
- (2) DNA dependant RNA polymerase
- (3) RNA dependant DNA polymerase
- (4) Topo isomerases

74. Role of sparger in sparged tank bioreactor is

- (1) Temperature control
- (2) PH control
- (3) Introduction of air into fermentor
- (4) Enhance growth of anaerobes

75. Ribo nucleotides are observed in all except

- (1) Codons
- (2) Anticodons
- (3) Ribozyme
- (4) PBR 322

76. Which of the following is *incorrectly* paired with its function(s)?

- (1) Cerebral cortex : Memory and communication
- (2) Hypothalamus : Major coordinating centre for sensory and motor signaling
- (3) Medulla oblongata : Controls respiration, cardiovascular reflexes and gastric secretions
- (4) Limbic system : Olfaction, autonomic responses, sexual behaviour, emotional reactions and motivation

77. Hormones that promote the development of mammary glands are
- (1) Prolactin and leutinising hormone
 - (2) Oestradiol and progesterone
 - (3) Prolactin and oxytocin
 - (4) Progesterone and relaxin
78. Corpus callosum is mainly composed of
- (1) Cytons
 - (2) Unmyelinated axons
 - (3) Dendrites
 - (4) Myelinated axons
79. Generally, age pyramids of human population show
- (1) Age groups in an ascending order from the apex to the base
 - (2) Natality and mortality rates of organisms at different ages
 - (3) Age distribution of males and females
 - (4) Probability that a person of specific age survives till his/her next birthday
80. Troponin is called a regulatory protein of the skeletal muscle fibre because it
- (1) Forms cross bridges between thick and thin filaments
 - (2) Acts as ATPase providing energy for muscle contraction
 - (3) Plays a role in masking and unmasking of active sites
 - (4) Sequesters calcium ions in a relaxing muscle fibre
81. Somaclonal variations are produced by
- (1) Colchicine treatment
 - (2) Hybridisation
 - (3) Irradiation with gamma rays
 - (4) Tissue culture
82. The foreign gene insert in *Flavr Savr*
- (1) Blocks the gene expression that promotes fruit ripening
 - (2) Allows the gene expression that suppresses fruit softening
 - (3) Codes for a sense mRNA
 - (4) Blocks the gene expression that delays ripening
83. Disease resistant & pest resistant varieties of *Brassica* respectively
- (1) Pusa Sawani & Pusa Gaurav
 - (2) Pusa Gaurav & Pusa Swarnim
 - (3) Pusa Swarnim & Pusa Sawani
 - (4) Pusa Swarnim & Pusa Gaurav
84. Aerobic bacteria are employed in
- (1) Fermentation
 - (2) Biogas plants
 - (3) Sewage treatment plants
 - (4) Bread production
85. Complete destruction of the biotic but not abiotic community can start a
- (1) Hydrarch succession
 - (2) Xerarch succession
 - (3) Secondary succession
 - (4) None of the above
86. The *correct* order of steps in DNA fingerprinting technique is
- (1) Restriction digestion → electrophoresis → blotting → hybridization → autoradiography
 - (2) Restriction digestion → electrophoresis → hybridization → blotting → autoradiography
 - (3) Electrophoresis → restriction digestion → blotting → autoradiography → hybridisation
 - (4) Blotting → restriction digestion → electrophoresis → hybridization → autoradiography

87. Match the items given in Column I with those in Column II and select the *correct option* given below :

<i>Column I</i>		<i>Column II</i>	
a. Reissner's membrane	i.	Between middle ear and inner ear	
b. Basilar membrane	ii.	Between scala vestibuli and scala media	
c. Tympanic membrane	iii.	Between scala tympani and scala media	
d. Oval window	iv.	Between external auditory meatus and middle ear	

	a	b	c	d
(1)	iii	ii	iv	i
(2)	ii	iii	i	iv
(3)	ii	iii	iv	i
(4)	iv	iii	ii	i

88. Which type of pyramid of numbers would be obtained with the following data?

- One big tree
- Insects feeding on the tree
- Small birds eating insects
- Large birds eating small birds

- Spindle - shaped
- Inverted
- Triangular
- Upright

89. Among the following sets of examples for convergent evolution, select the *incorrect* option.

- Flipper of whale and wing of bird
- Sweet potato and potato
- Eyes of octopus and of mammals
- Wings of bird and wings of butterfly

90. Mean arterial pressure is

- Close to diastolic pressure
- Diastolic pressure + 2/3 of pulse pressure
- Close to systolic pressure
- An exact average of systolic pressure and diastolic pressure

91. A particle has an initial velocity of 9 m/s due east and a constant acceleration of 2 m/s² due west. The distance covered by the particle during the fifth second of its motion is

- 0
- 0.5 m
- 2 m
- 2.5 m

92. A rubber ball is freely released from a height of 20m. Coefficient of restitution between ball and ground is 0.5. If time of contact of ball with ground during first collision is 0.01 sec, then acceleration of ball during the first collision is ____ ($g = 10 \text{ m/s}^2$)

- 1000 ms⁻²
- 2000 ms⁻²
- 3000 ms⁻²
- 3500 ms⁻²

93. If L, V, I, C represent self inductance, electric potential, electric current and electric capacitance then dimensional formula of $\frac{V^4 C^2}{I^2 L}$ is same as that of

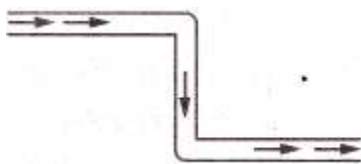
- Velocity
- Acceleration
- Force
- Energy

94. A ball of mass m is attached to the lower end of light vertical spring of force constant k. The upper end of the spring is fixed. The ball is released from rest with the spring at its normal (unstretched) length, and comes to rest again after descending through a distance x. Pick up the wrong option from the following options

- $x = \frac{mg}{k}$
- $x = \frac{2mg}{k}$
- The ball will have no acceleration at the position where it has descended through x/2.
- The ball will have an upward acceleration equal to g at its lowermost position.

95. A simple pendulum has a time period T . The bob is now given some positive charge.
- (A) If some positive charge is placed at the point of suspension, its time period will increase
- (B) If some positive charge is placed at the point of suspension, its time period will not change
- (C) If a uniform downward electric field is switched on, its time period will increase
- (D) If a uniform downward electric field is switched on, its time period will decrease
- (1) A and D are correct
- (2) A and C are correct
- (3) B and C are correct
- (4) B and D are correct
96. The escape velocity from the surface of a planet is v_e . A particle starts from rest at a very large distance from the planet, reaches the planet only under gravitational attraction, and passes through a smooth tunnel through its centre. Its speed at the centre of the planet will be
- (1) v_e
- (2) $1.5v_e$
- (3) $\sqrt{1.5} v_e$
- (4) $2v_e$

97.



The tube shown is of uniform cross-section kept in horizontal plane. An ideal liquid flows through it at a constant speed in the direction shown by the arrows. The liquid exerts on the tube

- (1) a net force to the right
- (2) a net force to the left
- (3) a clockwise torque
- (4) an anticlockwise torque

98. A uniform rod of weight W is free to rotate in a vertical plane about a hinge at one end. The hinge is fixed to a wall. If the rod is released from a horizontal position, what force will it exert on the hinge just after being released?
- (1) W
- (2) $\frac{W}{2}$
- (3) $\frac{W}{3}$
- (4) $\frac{W}{4}$
99. A horizontal tube, open at both ends, contains a column of liquid. The length of this liquid column does not change with temperature. Let γ = coefficient of volume expansion of the liquid and α = coefficient of linear expansion of the material of the tube
- (1) $\gamma = \alpha$
- (2) $\gamma = 2\alpha$
- (3) $\gamma = 3\alpha$
- (4) $\gamma = 0$
100. The root-mean-square (rms) speed of oxygen molecules (O_2) at a certain absolute temperature is v . If the temperature is doubled and the oxygen gas dissociates into atomic oxygen, the rms speed would be
- (1) v
- (2) $\sqrt{2} v$
- (3) $2v$
- (4) $2\sqrt{2} v$
101. When an ideal diatomic gas is heated at constant pressure, the fraction of the heat energy supplied which increases the internal energy of the gas is
- (1) $\frac{2}{5}$
- (2) $\frac{3}{5}$
- (3) $\frac{3}{7}$
- (4) $\frac{5}{7}$

102. A body cools from 50°C to 40°C in 5 minutes. The surrounding temperature is 20°C . In what further time (in seconds) will it cool to 30°C ?

- (1) 1500
- (2) 1000
- (3) $\frac{25}{3}$
- (4) $\frac{15}{2}$

103. If acceleration due to gravity on the surface of earth is 'g' and its mean density is 'ρ' then electrical capacitance of the earth is ____

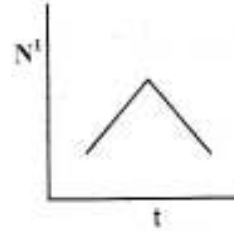
- (1) $\frac{\epsilon_0 g}{G\rho}$
- (2) $\frac{2\epsilon_0 g}{G\rho}$
- (3) $\frac{3\epsilon_0 g}{G\rho}$
- (4) $\frac{2\epsilon_0 g}{3G\rho}$

104. A metal string is fixed between rigid supports. It is initially at negligible tension. Its Young modulus is Y, density is ρ and coefficient of thermal expansion is α. If it is now cooled through a temperature, Δt. If string is set into transverse vibrations, transverse waves will move along it with a speed equals to

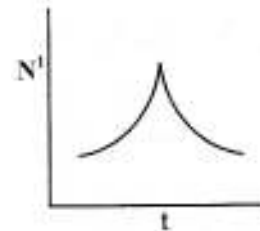
- (1) $Y\sqrt{\frac{\Delta t}{\rho}}$
- (2) $\alpha\Delta t\sqrt{\frac{Y}{\rho}}$
- (3) $\sqrt{\frac{Y\alpha\Delta t}{\rho}}$
- (4) $\Delta t\sqrt{\frac{Y\alpha}{\rho}}$

105. A railway engine whistling at a constant frequency N moves with a constant speed. It goes past a stationary observer standing just beside the railway track. The frequency (n) of the sound heard by the observer (N^1) is plotted against time (t). Which of the following best represents the resulting curve?

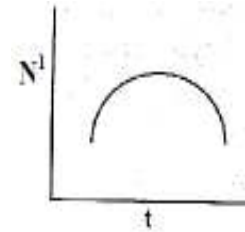
(1)



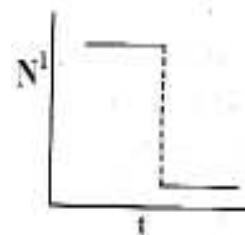
(2)



(3)



(4)



106. A thin lens of refractive index 1.5 has a focal length of 10 cm in air. When the lens is placed in a medium of refractive index 4/3, its focal power in dioptr is

- (1) 40
- (2) 20
- (3) 2.5
- (4) 2

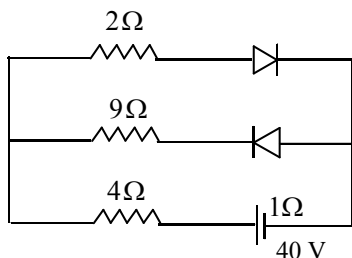
107. In a Young's double-slit experiment, let β be the fringe width, and let I_0 be the intensity at the central bright fringe. At a distance x from the central bright fringe, the intensity will be

- (1) $I_0 \cos\left(\frac{x}{\beta}\right)$
- (2) $I_0 \cos^2\left(\frac{x}{\beta}\right)$
- (3) $I_0 \cos^2\left(\frac{\pi x}{\beta}\right)$
- (4) $\left(\frac{I_0}{4}\right) \cos^2\left(\frac{\pi x}{\beta}\right)$

108. A long string uniformly charged with a charge of λ per unit length passes through an imaginary cube of edge a . The maximum possible flux of the electric field through the cube can be

- (1) $\frac{\lambda a}{\epsilon_0}$
- (2) $\frac{\sqrt{2}\lambda a}{\epsilon_0}$
- (3) $\frac{6\lambda a^2}{\epsilon_0}$
- (4) $\frac{\sqrt{3}\lambda a}{\epsilon_0}$

109. Both the diodes shown in the figure are of resistance 3Ω in forward biasing and ideal in reverse biasing. Electric power developed across 4Ω resistor is

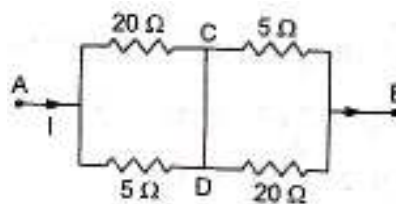


- (1) 16 W
- (2) 32 W
- (3) 48 W
- (4) 64 W

110. n identical cells, each of emf ϵ and internal resistance r , are joined in series to form a closed circuit. Out of which one cell (A) is joined with reversed polarity. The potential difference across any one cell, except A, is _____ (Neglect external resistance of connecting wire)

- (1) $\frac{2\epsilon}{n}$
- (2) $\frac{n-1}{n}\epsilon$
- (3) $\frac{n-2}{n}\epsilon$
- (4) $\frac{2n}{n-2}\epsilon$

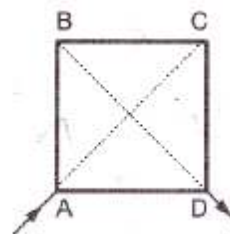
111.



Points C and D are connected by a wire of negligible resistance. When some potential difference is maintained between A and B, current I enters the network at A and leaves at B. Pick up the correct option

- (1) No current flows between C and D
- (2) Current $3I/5$ flows from D to C
- (3) Current $2I/5$ flows from D to C
- (4) Current $I/2$ flows from D to D

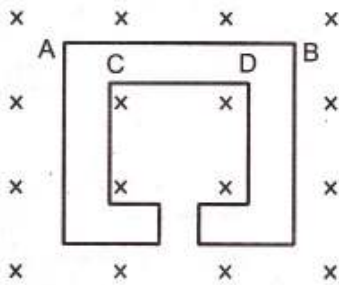
112.



ABCD is a square loop made of a uniform conducting wire of same material and same cross sectional area. A current enters the loop at A and leaves at D. The magnetic field is:

- (1) zero only at the centre of the loop
- (2) never zero at centre of the loop
- (3) zero at all points outside the loop
- (4) zero at all points inside the loop

113.



A wire is bent to form the double loop shown in the figure. there is a uniform magnetic field directed into the plane of the loop. If the magnitude of this field is decreasing, current will flow from

- (1) A to B and C to D
- (2) B to A and D to C
- (3) A to B and D to C
- (4) B to A and C to D

114. Work required to deflect a magnet from stable equilibrium position by an angle ' θ ' is W . Torque experienced by the magnet due to magnetic field is

- (1) $W \tan\left(\frac{\theta}{2}\right)$
- (2) $W \cot\left(\frac{\theta}{2}\right)$
- (3) $W \sin\left(\frac{\theta}{2}\right)$
- (4) $W \cos\left(\frac{\theta}{2}\right)$

115. A bar magnet oscillates with a time period T . Now it is cut into 20 parts by cutting it thrice parallel to axial line and four times parallel to equatorial line. If one piece is made to oscillate in same magnetic field its frequency of oscillation is

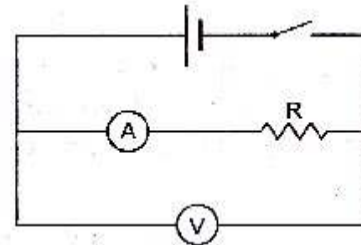
- (1) $\frac{T}{20}$
- (2) $\frac{4}{T}$
- (3) $\frac{5}{T}$
- (4) $\frac{20}{T}$

116. Let T be the mean life of a radioactive sample. 75% of the active nuclei present in the sample initially will decay in time

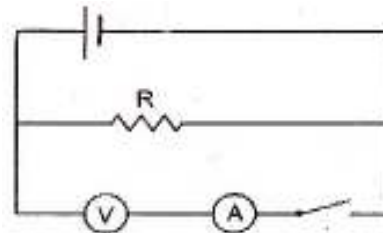
- (1) $2T$
- (2) $\frac{1}{2} (\ln 2) T$
- (3) $4T$
- (4) $2 (\ln 2) T$

117. Which of the circuits shown below is best suited to measure the resistance of a coil, R using Ohm's law. The symbols have their usual meanings. The ammeter has a finite resistance. The voltmeter is ideal

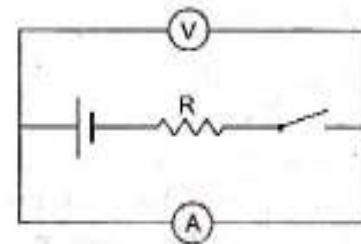
(1)



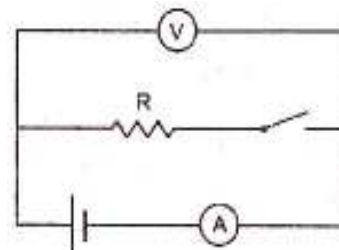
(2)



(3)



(4)



118. A particle of mass m and charge Q is placed in the electric field E which varies with time t as $E = E_0 \sin \omega t$. It will undergo simple harmonic motion of amplitude

- (1) $\frac{QE_0}{2m\omega^2}$
- (2) $\frac{QE_0}{m\omega^2}$
- (3) $\frac{2QE_0}{m\omega^2}$
- (4) $\frac{2QE_0}{3m\omega^2}$

119. A point mass of 1 kg collides elastically with a stationary point mass of 5 kg. After their collision, the 1 kg mass reverses its direction and moves with a speed of 2 ms^{-1} . Which of the following statements are correct for the system of these two masses ?

- (A) Total momentum of the system is 3 kg ms^{-1}
 - (B) Momentum of 5 kg mass after collision is 4 kg ms^{-1}
 - (C) Kinetic energy of the centre of mass is 0.75 J
 - (D) Total kinetic energy of the system is 4 J
- (1) A and C are correct
 - (2) B and C are correct
 - (3) A and D are correct
 - (4) B and D are correct

120. A hydrogen atom in an excited state emits a photon which has the longest wavelength of the Paschen series. Further emissions from the atom cannot include the

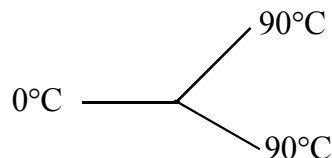
- (1) longest wavelength of the Lyman series
- (2) second-longest wavelength of the Lyman series
- (3) longest-wavelength of the Balmer series
- (4) second-longest wavelength of the Balmer

Series

121. The condition under which a microwave oven heats up a food item containing water molecules most efficiently is

- (1) Microwaves are heat waves, hence they always produce heating
- (2) Infra – red waves produce heating in a microwave oven
- (3) The frequency of the microwaves must match with the resonant frequency of the water molecules
- (4) The frequency of the microwaves has no relation with natural frequency of water molecules

122. Three rods made of the same material and having the same cross section have been joined as shown in the figure. Each rod is of the same length. The left and right ends are kept at 0°C and 90°C respectively. The temperature of the junction of the three rods will be



- (1) 45°C
- (2) 60°C
- (3) 30°C
- (4) 20°C

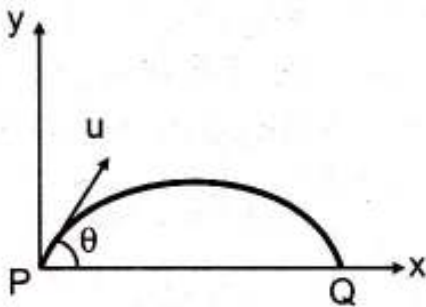
123. An α -particle and a proton are accelerated from rest by a potential difference of 100 V. After this, their de Broglie wavelengths are λ_α and λ_p respectively. The ratio of λ_α and λ_p , is

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

124. For the sum $(\vec{A} + \vec{B})$, difference $(\vec{A} - \vec{B})$ and cross product $(\vec{A} \times \vec{B})$ of two non zero and non linear vectors \vec{A} and \vec{B} to be mutually perpendicular, the compulsory condition is

- (1) \vec{A} and \vec{B} are perpendicular to each other and $|\vec{A}| = |\vec{B}|$
- (2) \vec{A} and \vec{B} perpendicular but their magnitudes can be of any non zero value
- (3) $|\vec{A}| = |\vec{B}|$ and their directions can be in any non collinear directions
- (4) Any one of the above

125. A projectile is projected obliquely with initial kinetic energy (K) and angle of projection θ from a initial position P as shown in figure. Torque acting on it when it is at the highest point of its motion about the point of projection is _____



- (1) $\frac{K \sin \theta}{2}$
- (2) $\frac{K \cos \theta}{2}$
- (3) $K \sin 2\theta$
- (4) $K \cos 2\theta$

126. The pressure inside two soap bubbles is 3 atmosphere and 114 cm of Hg. The ratio of their respective volumes is _____

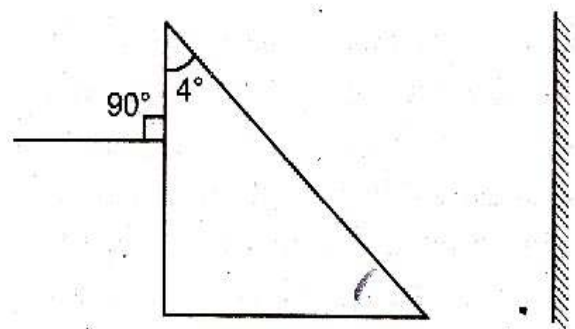
- (1) 1 : 8

- (2) 1 : 16
- (3) 1 : 27
- (4) 1 : 64

127. A uniform rod of length L has a mass per unit length λ and area of cross-section A. The elongation in the rod is l due to its own weight when it is suspended from the ceiling of a room. The Young's modulus of the rod is

- (1) $\frac{2\lambda g L^2}{A l}$
- (2) $\frac{\lambda g L^2}{2A l}$
- (3) $\frac{2\lambda g L}{A l}$
- (4) $\frac{\lambda g l^2}{A L}$

128. A prism having an apex angle 4° and refractive index 1.5 is located in front of a vertical plane mirror as shown in figure. Through what total angle is the ray is deviated due to its passage through the prism and then reflection due to the plane mirror ?

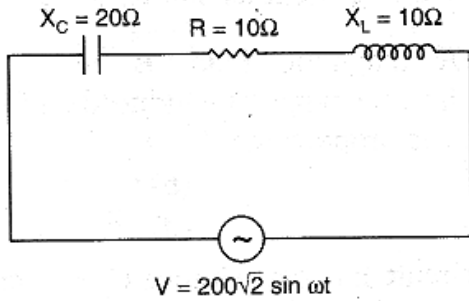


- (1) 176°
- (2) 4°
- (3) 178°
- (4) 2°

129. Which of the following statements is correct ?

- (1) Static friction is always greater than kinetic friction
- (2) Static friction is always equal to kinetic friction
- (3) Static friction can be greater than or equal to or less than kinetic friction
- (4) None

130. In the LCR circuit shown in figure. Pick up the wrong statement ?



- (1) current leads the applied emf
- (2) rms value of current is $10\sqrt{2}A$
- (3) power factor of the circuit is $\frac{1}{\sqrt{2}}$
- (4) RMS voltage drop across capacitor and inductor together is $300\sqrt{2} V$

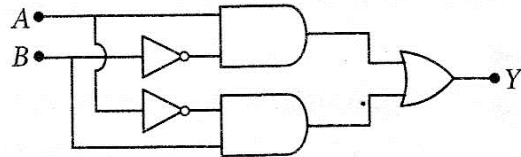
131. Three concentric metallic spherical shells of radii R , $2R$ and $3R$ are given charges Q_1 , Q_2 and Q_3 , respectively. It is found that the surface charge densities on the outer surfaces of the shells are equal. Then, the ratio of the charges given to the shells, $Q_1 : Q_2 : Q_3$, is

- (1) 1 : 2 : 3
- (2) 1 : 3 : 5
- (3) 1 : 4 : 9
- (4) 1 : 8 : 18

132. When a metallic surface is illuminated with radiation of wavelength λ , the stopping potential is V . If the same surface is illuminated with radiation of wavelength 2λ , the stopping potential is $\frac{V}{4}$. The threshold wavelength for the metallic surface is

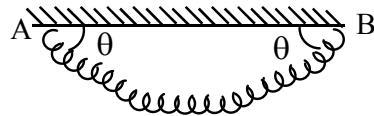
- (1) $\frac{5}{2}\lambda$
- (2) 3λ
- (3) 4λ
- (4) 5λ

133. In the combination of the following gates the output Y can be written in terms of inputs A and B as



- (1) $\overline{A \cdot B}$
- (2) $A \cdot \overline{B} + \overline{A} \cdot B$
- (3) $\overline{A \cdot B} + A \cdot B$
- (4) $\overline{A + B}$

134. A uniform spring of mass 'm' is suspended in equilibrium as shown. Tension in the spring at the lowest point C is



- (1) $\frac{Mg}{2 \sin \theta}$
- (2) $\frac{Mg}{2 \cos \theta}$
- (3) $\frac{Mg \sin \theta}{2 \cos \theta}$
- (4) $\frac{Mg \cos \theta}{2 \sin \theta}$

135. In a region, the electric potential is represented by $V(x, y, z) = 6x - 8xy - 8y + 6yz$, where V is in volts and x, y, z are in metres. The electric force experienced by a charge of 2 coulomb situated at point (1m, 1m, 1m) is

- (1) $6\sqrt{5}$ N
- (2) 30 N
- (3) 24 N
- (4) $4\sqrt{35}$ N

136. The electron in the hydrogen atom undergoes transition from higher orbits to orbit of radius 211.6 pm. This transition is associated with:

- (1) Lyman series
- (2) Balmer series
- (3) Paschen series
- (4) Brackett series

137. The orbit and orbital angular momentum of an

electron are $\frac{3h}{2\pi}$ and $\sqrt{\frac{3}{2}} \frac{h}{\pi}$ respectively.

The number of radial and angular nodes for the orbital in which the electron is present are respectively

- (1) 0, 2
- (2) 2, 0
- (3) 1, 3
- (4) 2, 2

138. At 300 K, the density of a certain gaseous molecule at 2 bar is double to that of dinitrogen (N_2) at 4 bar. The molar mass of gaseous molecule is :

- (1) 28 g mol^{-1}
- (2) 56 g mol^{-1}
- (3) 112 g mol^{-1}

(4) 224 g mol^{-1}

139. Van der Waal's equation for a gas is stated as $P = \frac{nRT}{V - nb} - a\left(\frac{n}{V}\right)^2$. This equation reduces

to the perfect gas equation $P = \frac{nRT}{V}$, when,

- (1) temperature is sufficiently high and pressure is low.
- (2) temperature is sufficiently low and pressure is high.
- (3) both temperature and pressure are very high.
- (4) both temperature and pressure are very low.

140. 20mL of 0.1 MH_2SO_4 solution is added to 30 mL of 0.2 M NH_4OH solution. The pH of the resultant mixture is:

[pK_b of $NH_4OH = 4.7$]

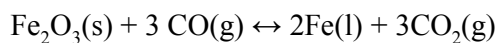
- (1) 9.4
- (2) 5.02
- (3) 9.0
- (4) 5.2

141. For a zero order reaction a graph plotted between half life Vs initial concentration gives a slope of (k =rate constant)

- (1) $\frac{1}{k}$
- (2) $\frac{1}{2k}$
- (3) k
- (4) $\frac{1}{k^2}$

142. A gas undergoes change from state A to state B. In this process, the heat absorbed and work done by the gas is 5 J and 8 J respectively. Now gas is brought back to A by another process during which 3 J of heat is evolved. In this reverse process of B to A.
- (1) 18 J of the work will be done by the gas
 - (2) 8 J of the work will be done by the gas
 - (3) 12 J of the work will be done by the surrounding on gas
 - (4) 6 J of the work will be done by the surrounding on gas
143. The entropy (S°) of the following substances are :
- CH_4 (g) $186.2 \text{ J K}^{-1} \text{ mol}^{-1}$
- O_2 (g) $205.0 \text{ J K}^{-1} \text{ mol}^{-1}$
- CO_2 (g) $213.6 \text{ J K}^{-1} \text{ mol}^{-1}$
- H_2O (l) $69.9 \text{ J K}^{-1} \text{ mol}^{-1}$
- The entropy change (ΔS°) for the reaction $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$ is :
- (1) $-312.5 \text{ J K}^{-1} \text{ mol}^{-1}$
 - (2) $-242.8 \text{ J K}^{-1} \text{ mol}^{-1}$
 - (3) $-108.1 \text{ J K}^{-1} \text{ mol}^{-1}$
 - (4) $-37.6 \text{ J K}^{-1} \text{ mol}^{-1}$
144. How many litres of water must be added to 1 litre of an aqueous solution of HCl with a pH of 1 to prepare an aqueous solution with pH of 2?
- (1) 0.1 L
 - (2) 0.9 L
 - (3) 2.0 L
 - (4) 9.0 L
145. A metal crystallises in a face centred cubic structure. If the edge length of its unit cell is 'a', the closest approach between two atoms in metallic crystal will be:
- (1) $\sqrt{2} a$
 - (2) $\frac{a}{\sqrt{2}}$
 - (3) 2a
 - (4) $2\sqrt{2} a$
146. -CO-NH- bond is absent in
- (1) Sucralose
 - (2) Alitame
 - (3) Saccharin
 - (4) Aspartame
147. The incorrect statement pertaining to the adsorption of a gas on a solid surface is
- (1) Adsorption is always exothermic
 - (2) Physisorption may transform into chemisorption at high temperature
 - (3) The extent of physisorption as well as chemisorption increases with increase in temperature
 - (4) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation.
148. Reduction potential of zinc electrode in contact with 0.01M ZnSO_4 is (Given $E_{\text{Zn}^{+2}/\text{Zn}}^0 = -0.76\text{V}$)
- (1) -0.82 V
 - (2) -0.7 V
 - (3) -0.88 V
 - (4) -0.64 V

149. The following reaction occurs in the Blast Furnace where iron ore is reduced to iron metal



Using the Le Chatelier's principle, predict which one of the following will not disturb the equilibrium ?

- (1) Removal of CO
- (2) Removal of CO₂
- (3) Addition of CO₂
- (4) Addition of Fe₂O₃

150. The group having triangular planar structures is

- (1) BF₃, NF₃, CO₃²⁻
- (2) CO₃²⁻, NO₃⁻, SO₃
- (3) NH₃, SO₃, CO₃²⁻
- (4) NCl₃, BCl₃, SO₃

151. A diatomic molecule has a dipole moment of 1.2 D. If its bond distance is equal to 2.0 Å, then the percent ionic character in the diatomic molecule is

- (1) 12.5%
- (2) 37%
- (3) 52%
- (4) 42%

152. The reason for 'drug induced poisoning' is

- (1) Binding reversibly at the active site of the enzyme
- (2) Bringing conformational change in the binding site of enzyme
- (3) Binding irreversibly to the active site of the enzyme
- (4) Binding at the allosteric sites of the enzyme

153. Column-I Column-II

- | | |
|-----------------|--------------------|
| A) Antacid | p) Equanil |
| B) Antibiotic | q) BHT |
| C) Traquillizer | r) Zantac |
| D) Antioxidant | s) Aminoglycosides |

- (1) A-p, B-q, C-s, D-r
- (2) A-q, B-p, C-r, D-s
- (3) A-r, B-s, C-p, D-q
- (4) A-r, B-s, C-q, D-p

154. The formation of which of the following polymers involves hydrolysis reaction ?

- (1) Nylon 6,6
- (2) Terylene
- (3) Nylon 6
- (4) Bakelite

155. Structure of some important polymers are given. Which one represents Buna-S ?

- (1) $\left(-\text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{C}}} = \text{CH} - \text{CH}_2 - \right)_n$
- (2) $\left(-\text{CH}_2 - \text{CH} = \text{CH} - \text{CH}_2 - \underset{\text{C}_6\text{H}_5}{\underset{|}{\text{CH}}} - \text{CH}_2 - \right)_n$
- (3) $\left(-\text{CH}_2 - \text{CH} = \text{CH} - \text{CH}_2 - \underset{\text{CN}}{\underset{|}{\text{CH}}} - \text{CH}_2 - \right)_n$
- (4) $\left(-\text{CH}_2 - \overset{\text{Cl}}{\underset{|}{\text{C}}} = \text{CH} - \text{CH}_2 - \right)_n$

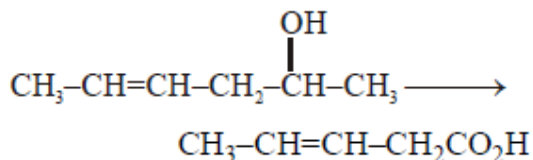
156. The incorrect statement among the following is :

- (1) α -glucose and β -glucose are anomers
- (2) α -glucose and β -glucose are enantiomers
- (3) Cellulose is a straight chain polysaccharide made up of only β -glucose units
- (4) The penta acetate of glucose does not react with hydroxyl amine.

157. Which of the following is optically inactive

- (1) Proline
- (2) Alanine
- (3) Valine
- (4) Glycine

158. Which is the most suitable reagent for the following transformation ?

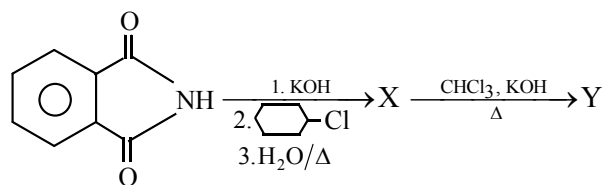


- (1) alkaline KMnO_4
- (2) I_2/NaOH
- (3) Tollen's reagent
- (4) CrO_2/CS_2

159. H_2O_2 turns blackened lead paintings to white colour. In this reaction PbS oxidizes to PbSO_4 . The number of moles of H_2O_2 needed to oxidize one mole of PbS is

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

160.



Y is

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

161. Which one of the following ions exhibits colour due to d - d transition and paramagnetism as well

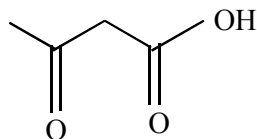
- (1) CrO_4^{2-}
- (2) $\text{Cr}_2\text{O}_7^{2-}$
- (3) MnO_4^{2-}
- (4) MnO_4^-

162. Which of the following is a wrong match?

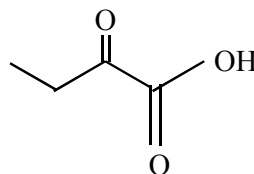
- (1) CH_3CHO - positive iodoform test
- (2) $\text{C}_6\text{H}_5\text{CHO}$ - positive Fehling's test
- (3) HCHO - positive 2, 4 DNP test
- (4) C_2H_4 - positive Baeyer's test

163. Decarboxylation is observed to be fastest in

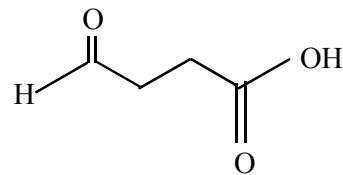
(1)



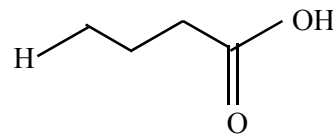
(2)



(3)



(4)



164. In Buckminster fullerene, the number of six membered and five membered rings respectively are

- (1) 6, 10
- (2) 20, 12
- (3) 8, 8
- (4) 12, 14

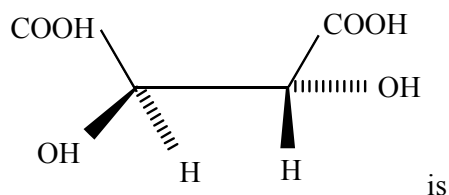
165. Which of the following anion has the smallest radius

- (1) H^-
- (2) F^-
- (3) Cl^-
- (4) Br^-

166. Thermal decomposition of the following is the best route to prepare BeF_2

- (1) BeF_2
- (2) $\text{NH}_4 \text{BeF}_2$
- (3) $(\text{NH}_4)_2 \text{BeF}_4$
- (4) $\text{NH}_4 \cdot \text{BeF}_2 \cdot \text{H}_2\text{O}$

167. The absolute configuration of



- (1) S, R
- (2) S, S
- (3) R, R
- (4) R, S

168. In the reaction



X is

- (1) N_2O_5
- (2) NO
- (3) NO_2
- (4) N_2O

169. Magnitude of electron gain enthalpy of

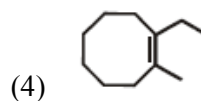
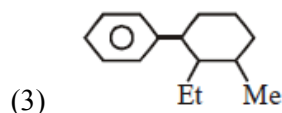
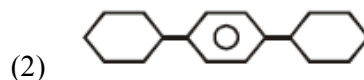
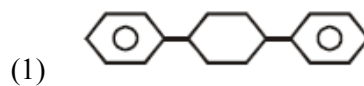
- (A) Carbon is greater than fluorine
- (B) Sulphur is lesser than fluorine
- (C) Iodine is higher than bromine
- (D) Chlorine is greater than sulphur

- (1) FFTF
- (2) TTFF

(3) FTFT

(4) TFTF

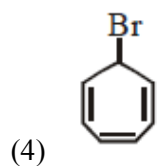
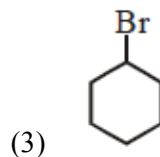
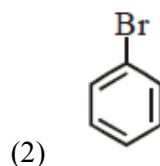
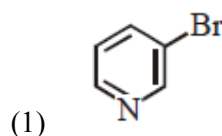
170. Which of the following does not show geometrical isomerism ?



171. The relative stability of +1 oxidation state of group 13 elements follows the order

- (1) $\text{Al} < \text{Ga} < \text{Tl} < \text{In}$
- (2) $\text{Tl} < \text{In} < \text{Ga} < \text{Al}$
- (3) $\text{Al} < \text{Ga} < \text{In} < \text{Tl}$
- (4) $\text{Ga} < \text{Al} < \text{In} < \text{Tl}$

172. Which of the following compounds will produce a precipitate with AgNO_3 ?



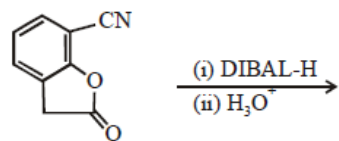
173. 0.32 grams of an organic compound containing sulphur produces 0.233 grams of barium sulphate. The percentage of sulphur in the compound is

- (1) 15
- (2) 10
- (3) 20
- (4) 25

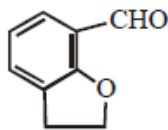
174. A mixture of X moles of Li_2CO_3 and Y moles of K_2CO_3 is heated. The volume of CO_2 produced at STP is

- (1) 22.4 x
- (2) 22.4 y
- (3) 44.8 (x + y)
- (4) 22.4 (x + y)

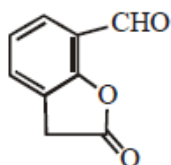
175. The major product of the following reaction is



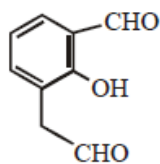
(1)



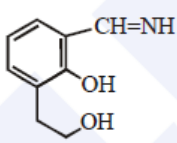
(2)



(3)



(4)



176. Peroxyacetyl nitrate (PAN), an eye irritant is produced by :

- (1) Acid rain
- (2) Photochemical smog
- (3) Classical smog
- (4) Organic waste

177. Tautomerism is not exhibited by

- (1) Benzaldehyde
- (2) Acetaldehyde
- (3) Acetone
- (4) Cyclohexanone

178. Sodium propionate on heating with sodalime gives

- (1) Pentane
- (2) Ethane
- (3) Propane
- (4) Butane

179. Least number of unpaired electrons in an octahedral complex formed with weak field ligand is for

- (1) Fe^{2+}
- (2) Cu^{+2}
- (3) Mn^{2+}
- (4) Co^{+2}

180. Statement-I : Azulene is an example of non benzenoid aromatic compound

Statement-II : It does not follow the Huckel's rule

- (1) Statement-I and Statement-II are true
- (2) Statement-I is true but Statement-II is false.
- (3) Statement-I is false but Statement-II is true.
- (4) Statement-I and Statement-II are false



SRI CHAITANYA EDUCATIONAL INSTITUTIONS,INDIA

A.P,TELANGANA,KARNATAKA,TAMILNADU,MAHARASHTRA,DELHI,RANCHI

SR ELITE, AIIMS S60, NEET MPL & MEDICON

Date : 02-02-19

NEET GRAND TEST - 6 KEY

BIOLOGY

1) 2	2) 4	3) 3	4) 4	5) 1	6) 4	7) 3	8) 3	9) 4	10) 3
11) 3	12) 1	13) 4	14) 3	15) 4	16) 4	17) 2	18) 2	19) 2	20) 1
21) 1	22) 1	23) 1	24) 1	25) 3	26) 1	27) 3	28) 3	29) 1	30) 3
31) 2	32) 1	33) 2	34) 3	35) 1	36) 1	37) 2	38) 4	39) 1	40) 2
41) 3	42) 2	43) 1	44) 2	45) 2	46) 4	47) 1	48) 2	49) 4	50) 2
51) 2	52) 3	53) 2	54) 4	55) 4	56) 1	57) 4	58) 4	59) 4	60) 3
61) 3	62) 3	63) 1	64) 3	65) 4	66) 2	67) 3	68) 4	69) 2	70) 4
71) 2	72) 2	73) 3	74) 3	75) 4	76) 2	77) 2	78) 4	79) 3	80) 3
81) 4	82) 1	83) 4	84) 3	85) 3	86) 1	87) 3	88) 1	89) 1	90) 1

PHYSICS

91) 2	92) 3	93) 4	94) 2	95) 4	96) 3	97) 3	98) 4	99) 2	100) 3
101) 4	102) 1	103) 3	104) 3	105) 4	106) 3	107) 3	108) 4	109) 4	110) 1
111) 2	112) 1	113) 3	114) 2	115) 3	116) 4	117) 4	118) 2	119) 1	120) 4
121) 3	122) 2	123) 4	124) 3	125) 3	126) 4	127) 2	128) 3	129) 3	130) 4
131) 2	132) 2	133) 2	134) 4	135) 4					

CHEMISTRY

136) 2	137) 1	138) 3	139) 1	140) 3	141) 2	142) 4	143) 2	144) 4	145) 2
146) 1	147) 3	148) 1	149) 4	150) 2	151) 1	152) 3	153) 3	154) 3	155) 2
156) 2	157) 4	158) 2	159) 4	160) 3	161) 3	162) 2	163) 1	164) 2	165) 2
166) 3	167) 3	168) 1	169) 3	170) 2	171) 3	172) 4	173) 2	174) 1	175) 3
176) 2	177) 1	178) 2	179) 2	180) 2					

SOLUTIONS
PHYSICS

91. To find the distance covered during certain time interval, first find the turning point, i.e., time at which $v = 0$.

Here $u = 9 \text{ m/s}$, $a = -2 \text{ m/s}^2$

\Rightarrow At $t = 4.5 \text{ sec}$, particle turns. Distance covered (S_1) between $t_1 = 4$ to $t_2 = 4.5 \text{ sec}$ is 0.25 m .

Distance covered (S_2) from $t_2 = 4.5 \text{ sec}$ to 5 sec is 0.25 m . Total distance covered during 5th second is $S_1 + S_2$

92. $V_{\text{striking}} = \sqrt{2gh_{\text{striking}}} = 20 \text{ ms}^{-1}$

$V_{\text{rebound}} = eV_{\text{striking}} = 10 \text{ ms}^{-1}$

$$a = \frac{\Delta V}{t} = \frac{10 - (-20)}{0.01}$$

$= 3000 \text{ ms}^{-2}$

93. CV^2 and LI^2 both represent energy

94. Loss in the potential energy of the ball = gain in the potential energy of the spring.

$$mgx = \frac{1}{2}kx^2 \text{ or } x = \frac{2mg}{k}$$

When the ball is at its lowest position, spring force = $kx = 2mg$

95. The time period will change only when the additional electrostatic force has a component along the direction of the displacement, which is always perpendicular to the string.

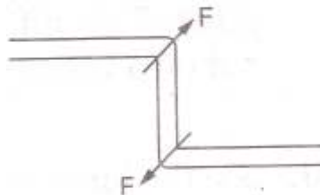
96. Taking the potential at a large distance from the planet as zero, the potential at the centre of the planet = $-\frac{3GM}{2R}$

$$\therefore \frac{1}{2}mv^2 = m \left[0 - \left(-\frac{3GM}{2R} \right) \right]$$

$$\text{or } v^2 = \frac{3GM}{R} = 3Rg = \frac{3}{2}(2RG) = \frac{3}{2}v_e^2$$

$$\text{or } v = \sqrt{1.5} v_e$$

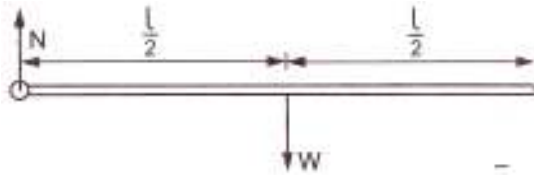
97. The forces exerted by the liquid at the bends are shown. (The liquid undergoes change of momentum only at these points, and hence the liquid and tube exert forces on each other). The two forces from a couple exerting a clockwise torque.



98. $\tau = W \cdot \frac{1}{2} = I\alpha = \left(\frac{ml^2}{3} \right) \alpha$ or $\alpha = \frac{3W}{2ml}$

$$a_{\text{CM}} = \alpha \cdot \frac{1}{2} = \frac{3W}{4m}$$

$$W - N = ma_{CM} = \frac{3W}{4} \text{ or } N = \frac{W}{4}$$



99. Let A_0 and A_1 be the areas of cross-section of the tube at temperature 0 and t respectively
 $l =$ length of the liquid column (constant)

V_0 and V_t be the volumes of the liquid at temperatures 0 and t respectively

$$V = lA_0 \quad V_t = lA_t$$

$$V_t = V_0 (1 + \gamma t) \quad A_t = A_0 (1 + 2\alpha t)$$

$$V_t = lA_0 (1 + 2\alpha t) = V_0 (1 + \gamma t) = lA_0 (1 + \gamma t)$$

$$\text{or } \gamma = 2\alpha$$

100. $c = \sqrt{\frac{3RT}{M}}$

Here, T becomes double and M becomes half.

101. $\Delta Q = nC_p \Delta T$ at constant pressure

$$\Delta U = nC_v \Delta T$$

$$\text{Fraction} = \frac{\Delta U}{\Delta Q} = \frac{C_v}{C_p} = \frac{1}{\gamma} = \frac{5}{7} \text{ for diatomic gas}$$

102. If a body cools from temperature θ_1 to θ_2 in time t , when the surrounding temperature is θ_0 , by Newton's law of cooling,

$$\frac{\theta_1 - \theta_2}{t} = c \left[\frac{\theta_1 + \theta_2}{2} - \theta_0 \right]$$

where $c =$ constant

103. $g = \frac{4}{3} \pi GR\rho$

$$R = \frac{3g}{4\pi R\rho}$$

$$C = 4\pi\epsilon_0 R$$

$$= 4\pi\epsilon_0 \left(\frac{3g}{4g\rho G\rho} \right)$$

$$= \boxed{\frac{3\epsilon_0 g}{G\rho}}$$

104. The tension in the string on cooling = $T = YA\alpha t$

Also, mass per unit length = $m = A\rho$

$$\text{Wave velocity} = \sqrt{\frac{T}{m}} = \sqrt{\frac{Y\alpha t}{\rho}}$$

105. Doppler effect depends on velocity, not on distance.

When the engine approaches the observer with constant velocity, the observer hears a frequency which is constant, and higher than the actual frequency. When the engine goes past the observer and recedes from him, he hears a frequency which is constant, and lower than the actual frequency.

$$106. \frac{1}{f} = \left(\frac{\mu_L}{\mu} - 1 \right) \left[\frac{1}{R_1} + \frac{1}{R_2} \right]$$

$$107. \Delta = x \frac{d}{D} \quad \therefore \text{Phase difference} = \phi = \frac{2\pi}{\lambda} \Delta$$

Let a = amplitude at the screen due to each slit $I_0 = k(2a)^2 = 4ka^2$, where k is a constant

For phase difference, amplitude = $A = 2a \cos\left(\frac{\phi}{2}\right)$ Intensity, $I = kA^2 = k(4a^2) \cos^2\left(\frac{\phi}{2}\right) = I_0 \cos^2$

$$\left(\frac{\pi}{\lambda} \Delta \right)$$

$$= I_0 \cos^2 \left(\frac{\pi}{\lambda}, \frac{xd}{D} \right) = I_0 \cos^2 \left(\frac{\pi x}{\beta} \right)$$

108. The maximum length of the string which can fit into the cube is $\sqrt{3}a$, equal to its body diagonal.

The total charge inside the cube is $\sqrt{3}a\lambda$, and hence and total flux through the cube is $\frac{\sqrt{3}a\lambda}{\epsilon_0}$

$$109. I = \frac{40}{1+4+2+3} = 4A$$

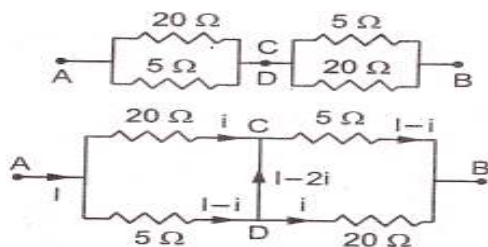
$$P_{4\Omega} = I^2 R$$

$$= 4^2 (4) = 64W$$

$$110. i = \frac{(n-2)\epsilon}{nr} \quad V_B - V_A = -ir + \epsilon = \epsilon - \frac{(n-2)\epsilon}{nr} r = \epsilon \left[1 - \frac{n-2}{n} \right] = \frac{2\epsilon}{n}$$

111. As C and D are joined, they must be at the same potential, and may be treated as the same point. This gives the equivalent resistance as 8Ω . If we distribute current in the network, using symmetry, $V_A - V_D = V_A - V_C$ or $20i = 5(I-i)$ or $i = I/5$

$$\therefore I - 2i = I - \frac{2I}{5} = \frac{3I}{5} = \text{current flowing from D to C}$$



112. The resistance of AD is one-third of the resistance along the parallel path AB + BC + CD. Hence if current i enters at A, $\frac{3i}{4}$ will flow along AD and $\frac{i}{4}$ along AB. The magnetic field at the centre due to the AD is equal and opposite to the combined effects of AB, BC and CD

113. Applying Lenz's law, clockwise emf is induced in both the loops. As the outer loop has greater area, larger emf is induced in it

$$114. W = MB[1 - \cos\theta]$$

$$\begin{aligned} \tau &= MB \sin \theta \\ &= \frac{W}{1 - \cos \theta} (\sin \theta) \\ &= \frac{W [2 \sin(\theta/2) \cos(\theta/2)]}{2 \sin^2(\theta/2)} \end{aligned}$$

115. $T = 2\pi \sqrt{\frac{I}{MB}}$

116. When 75% decays, 25% is left undecayed. This requires a time $t = 2T_{1/2}$, where $T_{1/2}$ = half - life =

$$\frac{\ln 2}{\lambda}. \text{ Also, } t = \frac{1}{\lambda}$$

$$\therefore t = 2 \left(\frac{\ln 2}{\lambda} \right) = 2(\ln 2) T$$

117. The voltmeter must measure the potential difference across the coil only. This is satisfied in (2) and (4). However, in (2) the key is not correctly placed

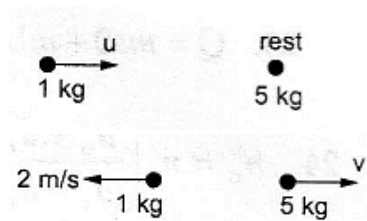
118. For a particle undergoing SHM with an amplitude A and angular frequency ω , the maximum acceleration = $\omega^2 A$

Here, the maximum force on the particle = QE_o

$$\therefore \text{its maximum acceleration} = \frac{QE_o}{m} = \omega^2 A \text{ or } A = \frac{QE_o}{m\omega^2}$$

119. $u = -2 + 5v$

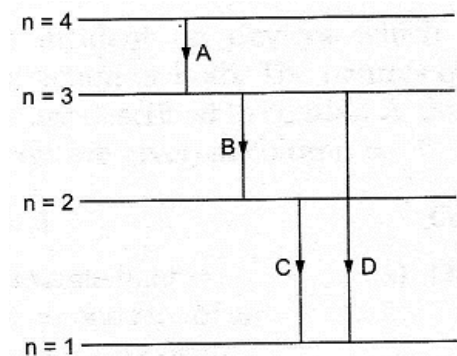
$$v + 2 = -1(0 - u) = u$$



Solving, $u = 3 \text{ m/s}$, $v = -1 \text{ m/s}$

$$\text{KE of CM} = \frac{1}{2} (6 \text{ kg}) (0.5 \text{ m/s})^2 = 0.75 \text{ J}$$

120.

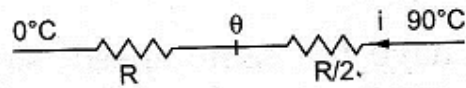


The photon emitted comes from the transition A. Further transitions possible are B (longest λ of the Balmer series), C (longest λ of the Lyman series) and D (second – longest λ of the Lyman series)

121. A microwave oven the frequency of the microwaves must match the resonant frequency of water molecules so that energy from the waves is transferred efficiently to the kinetic energy of the molecules

122. As the rods are made of the same material and have the same dimensions, they have the same thermal resistance, say R. Let θ be the temperature of the junction.

The circuit becomes as shown in the figure below



$$i = \frac{90^\circ\text{C} - \theta}{R/2} = \frac{\theta - 0^\circ\text{C}}{R}$$

$$\text{Or } 180^\circ\text{C} - 2\theta = \theta \quad \text{or} \quad \theta = 60^\circ\text{C}$$

123.
$$\lambda = \frac{h}{p} = \frac{h}{\sqrt{2(KE)m}} = \frac{h}{\sqrt{2Q(Pd)m}}$$

124. Let $\vec{A} = a_1\hat{i} + a_2\hat{j} + a_3\hat{k}$ and $\vec{B} = b_1\hat{i} + b_2\hat{j} + b_3\hat{k}$

Given that $\vec{A} + \vec{B}$ is perpendicular to $\vec{A} - \vec{B}$

$$\text{i.e., } (\vec{A} + \vec{B}) \cdot (\vec{A} - \vec{B}) = 0$$

$$\text{or } (a_1 + b_1)(a_1 - b_1) + (a_2 + b_2)(a_2 - b_2) + (a_3 + b_3)(a_3 - b_3) = 0$$

$$\text{or } a_1^2 + a_2^2 + a_3^2 = b_1^2 + b_2^2 + b_3^2$$

$$\text{or } |\vec{A}| = |\vec{B}|$$

Cross product of \vec{A} and \vec{B} is perpendicular to the plane formed by \vec{A} and \vec{B} or $\vec{A} + \vec{B}$ and $\vec{A} - \vec{B}$

125.
$$\tau_{\text{of Mg at highest point wrt P.O.P}} = Mg \left[\frac{R}{2} \right]$$

$$= \frac{Mg}{2} \left[\frac{u^2 \sin 2\theta}{g} \right]$$

$$= \frac{1}{2} Mu^2 \sin 2\theta$$

$$= K \sin 2\theta$$

126. $P_{\text{Net1}} = 3 \text{ atm}$

$$P_{\text{Net2}} = 114 \text{ cm of Hg} = 1.5 \text{ atm}$$

$$\Delta P_1 = 2 \text{ atm}$$

$$\Delta P_2 = 0.5 \text{ atm}$$

$$\Delta P = \frac{4T}{R}$$

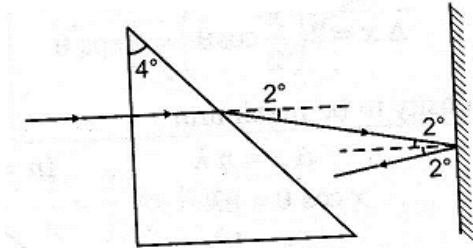
127. Increase in length due to own weight

$$l = \int_0^L \frac{(L-x)mg dx}{LAY} = \frac{mgL}{2AY} \quad (\text{Here, } m = \lambda L)$$

$$\text{or } Y = \frac{mgL}{2Al} = \frac{\lambda gL^2}{2Al}$$

128. $\delta_{\text{prism}} = (\mu - 1)A = (1.5 - 1)4^\circ = 2^\circ$

$$\therefore \delta_{\text{total}} = \delta_{\text{prism}} + \delta_{\text{mirror}}$$



$$\begin{aligned} &= (\mu - 1)A + (180 - 2i) \\ &= (1.5 - 1)4^\circ + (180 - 2 \times 2^\circ) \\ &= 2^\circ + 176^\circ = 178^\circ \end{aligned}$$

129. Static friction can be greater than or equal to or less than kinetic friction

130. Since $X_C > X_L$, current will lead

$$\text{Impedance } Z = \sqrt{R^2 + (X_C - X_L)^2} = 10\sqrt{2}\Omega$$

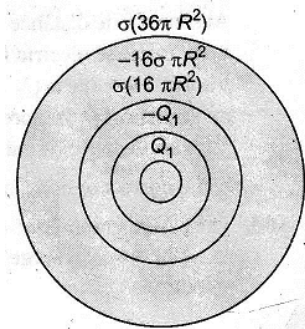
$$I_{\text{rms}} = \frac{V_{\text{rms}}}{Z} = \frac{200}{10\sqrt{2}} = 10\sqrt{2}A$$

$$\text{Power factor } \cos \phi = \frac{R}{Z} = \frac{1}{\sqrt{2}}$$

$$V_R = i_{\text{rms}}R = 100\sqrt{2}V$$

131. $Q_1 = \sigma(4\pi R^2) = 4\pi\sigma R^2$

$$Q_2 = 16\pi\sigma R^2 - Q_1 = 12\pi\sigma R^2$$



$$Q_3 = 36\pi\sigma R^2 - 16\pi\sigma R^2$$

$$= 20\pi\sigma R^2$$

$$Q_1 : Q_2 : Q_3 = 1 : 3 : 5$$

132. According to Einstein's photoelectric equation,

$$eV_s = \frac{hc}{\lambda} - \frac{hc}{\lambda_o}$$

$$\therefore \text{As per question, } eV = \frac{hc}{\lambda} - \frac{hc}{\lambda_o} \dots \text{(i)}$$

$$\frac{eV}{4} = \frac{hc}{2\lambda} = \frac{hc}{\lambda_o} \dots \text{(ii)}$$

From equations (i) and (ii), we get

$$\frac{hc}{2\lambda} - \frac{hc}{4\lambda} = \frac{hc}{\lambda_o} - \frac{hc}{4\lambda_o}$$

$$\Rightarrow \frac{hc}{4\lambda} = \frac{3hc}{4\lambda_o} \text{ or } \lambda_o = 3\lambda$$

$$133. Y = (A \cdot \bar{B} + \bar{A} \cdot B)$$

$$134. T_A \sin \theta = \frac{Mg}{2}$$

$$T_A \cos \theta = T_C$$

$$\frac{Mg}{2 \sin \theta} \cos \theta = T_c$$

135. Here. $V(x, y, z) = 6x - 8xy - 8y + 6yz$. The x , y and z components of electric field are

$$E_x = -\frac{\partial V}{\partial x} = -\frac{\partial}{\partial x}(6x - 8xy - 8y + 6yz)$$

$$= -(6 - 8y) = -6 + 8y$$

$$E_y = -\frac{\partial V}{\partial y} = -\frac{\partial}{\partial y}(6x - 8xy - 8y + 6yz)$$

$$= -(-8x - 8 + 6z) = 8x + 8 - 6z$$

$$E_z = -\frac{\partial V}{\partial z} = -\frac{\partial}{\partial z}(6x - 8xy - 8y + 6yz) = -6y$$

$$\vec{E} = E_x \hat{i} + E_y \hat{j} + E_z \hat{k}$$

$$= (-6 + 8y) \hat{i} + (8x + 8 - 6z) \hat{j} - 6y \hat{k}$$

At point (1, 1, 1)

$$\vec{E} = (-6 + 8) \hat{i} + (8 + 8 - 6) \hat{j} - 6 \hat{k} = 2 \hat{i} + 10 \hat{j} - 6 \hat{k}$$

The magnitude of electric field \vec{E} is

$$\vec{E} = \sqrt{E_x^2 + E_y^2 + E_z^2} = \sqrt{(2)^2 + (10)^2 + (-6)^2}$$

$$= r140 = 2\sqrt{35} NC^{-1}$$

Electric force experienced by the charge

$$F = qE = 2C \times 2\sqrt{35} NC^{-1} = 4\sqrt{35} N$$