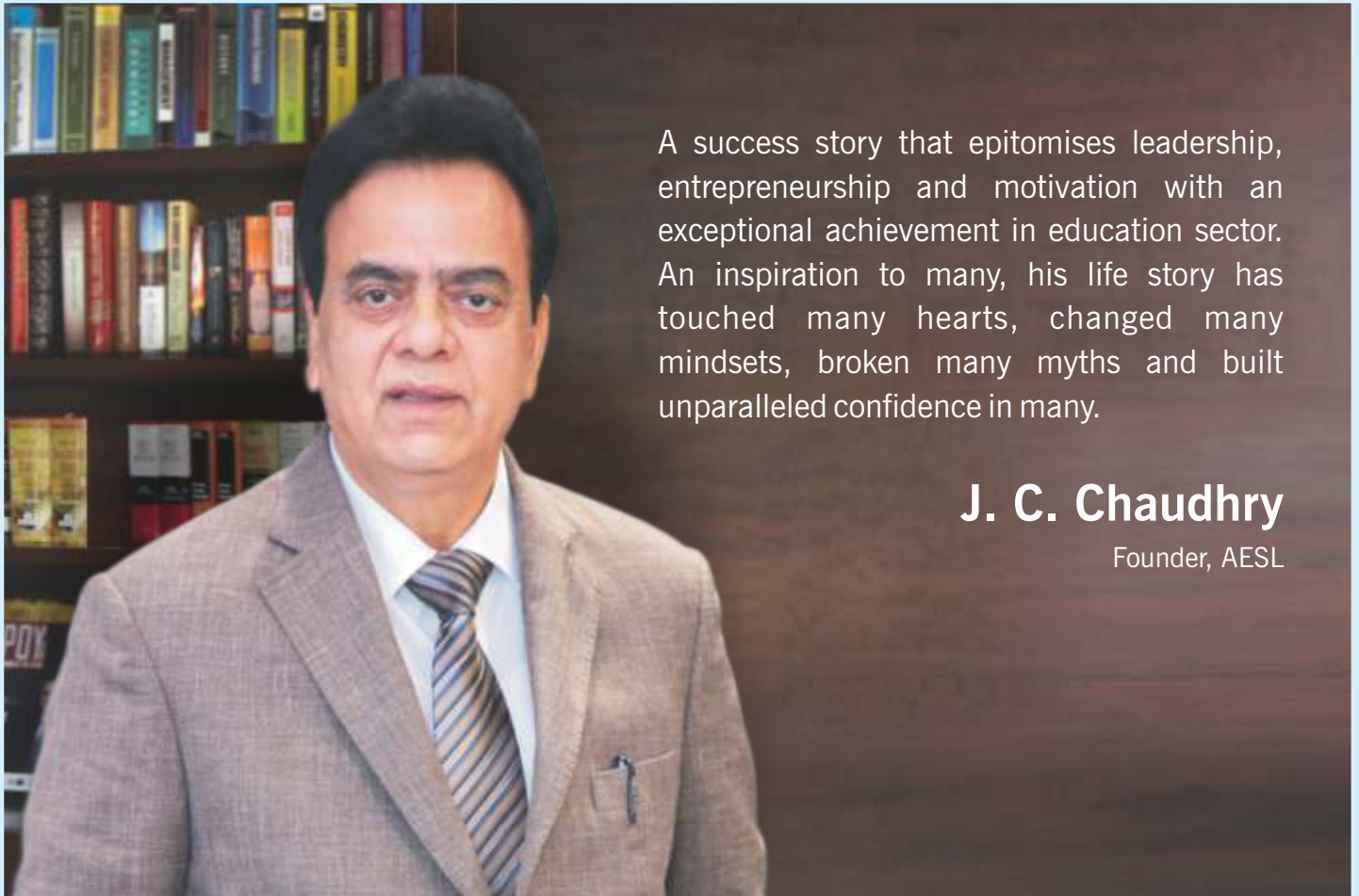


CAMPUS RECRUITMENT

INFORMATION SHEET: 2023 SESSION





A success story that epitomises leadership, entrepreneurship and motivation with an exceptional achievement in education sector. An inspiration to many, his life story has touched many hearts, changed many mindsets, broken many myths and built unparalleled confidence in many.

J. C. Chaudhry

Founder, AESL

Akash Educational Services Limited (AESL) is a leading educational institution in India that provides comprehensive test preparatory services for students preparing for medical and engineering entrance examinations, school/board exams and competitive and scholarship exams such as NTSE, KVPY, and Olympiads. The "Aakash" brand is associated with quality test preparation and a proven student selection track record in various medical and engineering entrance examinations.

BYJU'S - India's largest ed-tech company and a world leader in technology based learning solutions, now joins hands with Aakash, to give students an unmatched learning experience with an unbeatable edge. With BYJU'S sharing our values and vision, we are excited to continue our efforts in improving our existing offering to students, by leveraging our strengths and delivering increased value and working in the direction of launching innovative products and courses.

AESL provides its services through classroom-based coaching, digital and distance learning programs which supplement its classroom courses and allow students to engage in self-paced learning. It also offers short-term classroom courses to prepare students for upcoming examinations. Additionally, it delivers and supports its education channels through digital features via Aakash i-tutor and Aakash Live. AESL has partnered with Blackstone, a global investment management firm, to build country's largest education company.

With more than 34+ years of operational experience in the test preparatory coaching industry, the company has a pan India network of 300+ Aakash Centres with an annual student base of more than 3,00,000+ students and an employee count of more than 9000 pan India with corporate office at Aakash Tower, 8, Pusa Road, New Delhi – 110005.

National & International Awards Honoured to Dr. JC Chaudhry



2022



BITS Pilani
Distinguished
Alumnus Award

2022



Bhartiya Mahantam
Vikas Puraskar
by AsiaOne

2022



Guinness World
Record in
Numerology

2020



Entrepreneurship
Award by Ph.D.
Chamber of Commerce

2019



Dr APJ Abdul Kalam
Award For Excellence
in Education
& Healthcare

2019



2019– Global Gandhi
Award by Khaddargram
International
Pvt. Ltd in London

2019



Key Note Speaker on
Role of Numerology
at Indo-European
Investors Meet

2018



IEBF Excellence Award
by Indo-European
Business Forum

2018



Key Note Speaker
Award at 'Indo-
European Investors Meet'
India - UAE Partnership
at Portcullis House
of Parliament, London

2018



Global Education
Leaders Award at
Summit (IUPS)

2018



Global Asian
of the Year by Asian
Business & Social
Forum Singapore

2017



Life Time Achievement
Award at India-
UAE Business and
Social Forum

2016



Person of the
Year Award 2016-17,
2015-16 by Asia One
at Abu Dhabi

2016



The World's Greatest
Leaders- India 2015-16
by Asia One
at Abu Dhabi

2014



'Hall of Fame 2014'
presented
by Inc. India

and more awards.....

CAMPUS RECRUITMENT

INFORMATION SHEET: 2023 SESSION

Name of the Firm : Aakash Educational Services Limited

Postal Address : Aakash Tower, 8, Pusa Road, New Delhi

City : New Delhi

Pin Code : 110005

Contact Number : +91-8595250394

Fax Number : +91-11-476 23452

Website : www.aakash.ac.in

Interview Team Contact Information:

Name	Designation	Contact Details
D Praveen Kumar	Deputy Manager	+91-9205557065
Kamal Sharma	Assistant General Manager	campus@aesl.in

Job Profile:

Job Designation : Assistant Lecturer

Job Description (Brief) :

1. Deliver Classroom session (Online/Offline)
2. Undertake doubt clearing sessions.
3. Develop & conduct daily practice test.
4. Course content development.
5. Student & parent counseling.
6. Mentoring & coaching junior faculties.
7. Contribute to certain centre level administration.

Place of Posting : Andhra Pradesh | Assam | Bihar | Chhattisgarh | Delhi/NCR | Goa | Gujarat | Haryana | Jammu & Kashmir | Jharkhand | Karnataka | Kerala | Madhya Pradesh | Maharashtra | Odisha | Punjab | Rajasthan | Tamil Nadu | Telangana | Uttar Pradesh | Uttarakhand | West Bengal

Tentative Joining Date : 30th October 2023

Eligibility Criteria:

Mathematics, Physics & Chemistry - B.Tech/M.Tech/M.Sc

Botany & Zoology - M.Sc in Botany or Zoology

Candidates who will be completing graduation/post-graduation in the year 2023 are eligible to apply.

CGPA : Above 6.0
or equivalent
percentage

Cost to Company (AESL)

CTC (Range of Salary Grades on confirmed services)

Salary Grade 1. **7,25,000** Salary Grade 2. **7,50,000**

Salary Grade 3. **8,25,000** Salary Grade 4. **9,00,000**

Other Benefits

Gratuity, Insurance (Mediclaime & Accidental) Travel Allowance, Leave Encashment etc.

Retention Bonus

₹ 3,00,000*
(Over and above CTC)

You will be entitled for Retention Bonus of Rs.3 lakh which will be paid to you in 3 equal installments: -

- First, INR 1 lakh on completion of 1 year with the Company & it will be paid along with succeeding months' salary.
- Second, INR 1 lakh will be paid along with the Performance Appraisal of FY'2024-25.
- Third, INR 1 lakh will be paid along with the Performance Appraisal of FY'2025-26.

CAMPUS RECRUITMENT

INFORMATION SHEET: 2023 SESSION

Career Path

1. Candidates who will be joining Aakash Educational Services Limited (hereinafter referred as AESL in short) will have to sign the service agreement of 2 years
2. During Training - Candidate will receive 60 % of his monthly offered salary.
3. Six month Probation – During probation period Candidate will receive 75% of his monthly offered salary.
4. After successful completion of a six month's probation period, the candidate will start receiving his/her monthly offered salary subject to statutory deductions.
5. Training will be conducted in classroom mode in Delhi or Bangalore. During the training & probation period, the candidate will be paid INR 7500 per month in addition to the monthly salary. The above mentioned amount will be provided against lodging expenses incurred by the candidate during the period of stay. The payment of above mentioned amount shall not be applicable for candidates posted at their home location. Lodging allowance of INR 7500 shall be paid only if training is conducted on classroom mode.
6. During Training, candidates will be provided complimentary lunch for all working days of the month.
7. Depending upon the candidate's performance AESL reserves the right including but not limited to extend or reduce the training or probation period or can relieve from services.

Campus Recruitment Process

Percentage Criteria	: Above CGPA 6.0 or Equivalent Percentage
Subject Options	: Physics Chemistry Botany Zoology Mathematics
Objective Test Details Online Mode	: Duration 90 minutes
Syllabus/Topic of Test	: 11th & 12th standard (CBSE pattern) of concerned Subject
Topic/Duration of Lecture	: Of candidate's choice from the given list of Topics/10-20 minutes
Demo Lecture Recording	: Candidates clearing subject test should make a video(5-10 min duration) of their lecture demonstration & upload it on the google link provided by AESL. Candidates can choose the topic of lecture demonstration from the given list of topics.
Pre Placement Talk & Process	: Online/Offline Mode
Subject Matter Expert Round	: Only for candidates clearing subject test. Subject expert will ask questions from the subject candidate has chosen.
Personal Interview with HR	: Only for candidates clearing subject matter expert round



INTERVIEW PROCESS

Written Exam



Lecture Recording



HR Round



Subject Matter Expert Round



Pre-Placement Talk

Aakash BYJU'S Nationwide Centres

- Corporate Classroom Branches
- Franchise Classroom Centres
- 300+ Branches & Centres Across India
- New Branches



The pictorial representation does not purport to be the exact political map of India. Map not to scale. For representation only.



Regd. Office : Aakash Tower, 8 Pusa Road, Karol Bagh, New Delhi-110005.
Ph.: 011-47623456 Fax : 011-47623472

MM : 160

Sample Paper : Campus Recruitment Test Botany (Medical) Time : 1½ Hr.

Complete Syllabus of Class XI & XII

Topics : Cell : The unit of life, Cell Cycle and Cell Division, Living World, Biological classification, Morphology & Anatomy of Flowering Plants, Plant Kingdom, Plant Physiology, Reproduction in Organisms, Sexual reproduction in Flowering plants, Genetics(Principles of Inheritance & Variation, Molecular Basis of Inheritance), Strategies for Enhancement in Food Production, Microbes in Human Welfare, Organisms and Populations, Ecosystem Biodiversity & Conservation, and Environmental Issues.

Instructions:

- Use ball point pen only to darken the appropriate circle.
- Mark should be dark and should completely fill the circle.
- Darken only one circle for each entry.
- Darken the circle in the space provided only.
- Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
- Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score.

1. In Snapdragon, pure line tall plant with red flower was crossed with dwarf and white flowered plant; F_1 was test crossed to obtain F_2 . What is the probability of getting progeny with dominant parental generation traits?

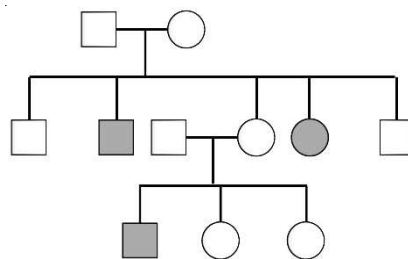
- | | |
|---------|---------|
| (1) 62% | (2) 50% |
| (3) 25% | (4) 0% |

2. Select **correct** match.

- | | |
|---------------------------------|------------------------------|
| a. Palm crease | (i) Philadelphia syndrome |
| b. Gynaecomastia | (ii) Turner's syndrome |
| c. Rudimentary ovaries | (iii) Klinefelter's syndrome |
| d. Chronic myelogenous leukemia | (iv) Down's syndrome |

- a(iv), b(iii), c(ii), d(i)
- a(iii), b(iv), c(ii), d(i)
- a(iv), b(iii), c(i), d(ii)
- a(ii), b(iii), c(iv), d(i)

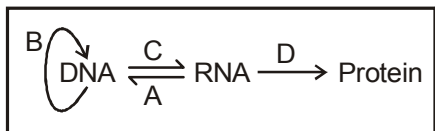
3. The given pedigree chart represents the inheritance of which of the genetic disorders mentioned ?



- | | |
|-----------------------|---------------------|
| a. Myotonic dystrophy | b. Polydactyly |
| c. PKU | d. Colour-blindness |
| e. Achondroplasia | f. Morphan syndrome |
| g. Porcupine skin | h. SCA |

- a, b & f
- c, d & e
- c & h
- f & g

4. Consider the given figure and select correct option for labels marked A, B, C & D.



- (1) A - DNA dependent DNA polymerase
 B - Replication
 (2) C - DNA dependent RNA polymerase
 A - RNA dependent DNA polymerase
 (3) C - RNA dependent RNA polymerase
 D - DNA dependent Ribozyme
 (4) B - RNA dependent DNA polymerase
 D - RNA dependent peptidyl transferase
5. Select **correct** statement.
- (1) RNA is more labile due to methyl uracil
 (2) DNA is preferred for the transmission of genetic information
 (3) RNA acts as adapter and catalyst
 (4) Presence of thymine confers stability to the helical structure of DNA
6. How many taxons mentioned in the box belong to lowest category with the maximum number of common characteristics?

Felis, Petunia, Lion, Mangifera indica, Brinjal, Dicots, Dog, Monocots, Mosses, Muscidae, Angiosperm, Grasses

- (1) Nine (2) Seven
 (3) Four (4) Six
7. The scientific name of a microorganism which is symbiotically associated with the root of most of the higher plants like *Pinus*, has been standardised in accordance to the rules of
- (1) ICBN (2) ICNB
 (3) ICNCP (4) ICZN
8. Organisms having cellular body organisation, with ability to oxidise various inorganic substances and use the released energy for their ATP production; are
- A. Nitrifying bacteria of Kingdom Monera in Linnaeus system.
 B. Sulphur bacteria belonging to Kingdom Protista in Haeckel system.
 C. Holophytic protistans.

- D. Non-pigmented iron bacteria of Kingdom Monera in Whittaker system.

- (1) A, B & D are correct (2) A & B are correct
 (3) C & D are correct (4) B & D are correct
9. Which of the following statement is correct for Virus?
- (1) Form plasmodium stage after aggregation in favourable condition
 (2) Nucleo-proteinous Monerans
 (3) Obligate intercellular parasites of infectious nature
 (4) Have only one type of nucleic acid which is infectious
10. Criteria like DNA base sequencing for classifying various organisms is considered in
- (1) Karyotaxonomy
 (2) Cytotaxonomy
 (3) Chemotaxonomy
 (4) More than one option is correct
11. Select correct match w.r.t. placentaion.
- a. Placenta forms a ridge on ventral (i) Parietal suture
 b. Common type of placentaion (ii) Basal
 c. Most advanced type placentaion (iii) Axile
 d. Ovules on peripheral (iv) Marginal part of the ovary
- (1) a(iv), b(iii), c(ii), d(i) (2) a(iv), b(iii), c(i), d(ii)
 (3) a(iii), b(iv), c(ii), d(i) (4) a(ii), b(iii), c(i), d(iv)
12. Features like actinomorphic flower, axile placentaion and endospermous seeds are common in
- (1) Solanaceae and Liliaceae
 (2) Liliaceae and Fabaceae
 (3) Brassicaceae and Fabaceae
 (4) Graminae and Liliaceae
13. The meristems that occur in mature regions of roots and shoots of many plants are
- (1) Protoderm and procambium
 (2) Ground meristems and intercalary meristems
 (3) Dedifferentiated tissues
 (4) Redifferentiated tissues

14. Select **incorrectly** matched pair.
- (1) Collenchymatous hypodermis – Dicot root
 - (2) Conspicuous parenchymatous ground tissue – Monocot root
 - (3) Large and well developed pith – Dicot stem
 - (4) Abundant starch grains in innermost layer of cortex – Dicot stem
15. Which of the following tissues is/are obliterated due to the continued formation and accumulation of secondary xylem?
- (1) Primary xylem and pith
 - (2) Phellem and phelloderm
 - (3) Primary and secondary phloem
 - (4) Primary phloem only
16. Select **correct** match.
- a. Steroidal hormones (i) Chondriosome
 - b. Hydrolases (ii) SER
 - c. Oxidative phosphorylation (iii) Lysosomes
 - d. Storage of proteins (iv) Ribosomes
(v) Aleuroplast
- (1) a(ii), b(iii), c(i), d(v)
 - (2) a(ii), b(iii), c(i), d(iv)
 - (3) a(iii), b(ii), c(i), d(v)
 - (4) a(i), b(iii), c(ii), d(iv)
17. Secondary constriction differs from primary constriction in being
- (1) Present in all chromosomes near telomere
 - (2) Heterochromatin
 - (3) Euchromatin
 - (4) Attachment site for spindle fibres
18. What would be the number of bivalents (A) in metaphase I and DNA amount in metaphase II (B) in a dividing cell if microspore has 30 chromosomes with 10 picogram DNA?
- (1) A = 30, B = 40 Pg
 - (2) A = 60, B = 40 Pg
 - (3) A = 30, B = 60 Pg
 - (4) A = 30, B = 20 Pg
19. Active transport differs from facilitated transport in
- (1) Requirement of special membrane protein
 - (2) Direction of transport
 - (3) Highly selective nature
 - (4) Showing transport saturation
20. In photosynthetic pathway of Sorghum plant C₄-acids are decarboxylated in _____ to start _____ enzyme activity.
- (1) Mesophyll; PEPcase
 - (2) Bundle sheath cell; RuBisCO
 - (3) Mesophyll; RuBisCO
 - (4) Bundle sheath cell, PEPcase
21. Find **correct** match w.r.t. PGRs.
- a. Promotes the abscission of older, mature leaves and fruits (i) ABA
 - b. Increases the length of grape stalk (ii) Cytokinin
 - c. Adventitious shoot formation (iii) Gibberellin
 - d. Increases the tolerance of plants to various kinds of stresses (iv) Auxins
- (1) a(iv), b(iii), c(ii), d(i)
 - (2) a(iv), b(iii), c(i), d(ii)
 - (3) a(iii), b(iv), c(ii), d(i)
 - (4) a(i), b(iii), c(iv), d(ii)
22. A - Cell division is itself a mode of reproduction in protists and monerans.
B - Neelakurinji is annual with distinct vegetative, reproductive and senescent phase.
C - In majority of organisms, male gamete is motile and the female gamete is stationary.
- (1) All are correct
 - (2) A & B are correct
 - (3) Only B is incorrect
 - (4) Only A is incorrect
23. Which of the following type of life cycle is associated with the organisms where zygote develops a thick wall that is resistant to desiccation and damage?
- (1) Diplontic
 - (2) Haplontic
 - (3) Haplo-diplontic
 - (4) Diplo-Haplontic

24. A typical angiosperm anther is
- (1) Monothealous and tetrasporangiate
 - (2) Bilobed and bisporangiate
 - (3) Dithealous and trilobed
 - (4) Bilobed and tetrasporangiate
25. Select **correct** statement w.r.t. female gametophyte development in flowering plants.
- (1) Micropylar megaspore undergoes three free nuclear mitosis
 - (2) Six nuclei are surrounded by cell walls and organised into cells
 - (3) The large central cell has two nuclei situated above egg apparatus
 - (4) Centrifugal cytokinesis starts after eight-nucleate stage
26. Which outbreeding device prevents both Autogamy and Geitonogamy in papaya?
- (1) Self-incompatibility (2) Dichogamy
 - (3) Heterostyly (4) Dioecism
27. Select the **incorrect** match.
- (1) Apospory - Diploid egg
 - (2) Apomictic embryo - Nucellar embryo
 - (3) False fruits - Unfertilized ovary
 - (4) Perispermic seed - Blackpepper
28. In eukaryotes, a gene is literally not defined as
- (1) Cistron
 - (2) Functional unit of inheritance
 - (3) A segment of DNA coding for a polypeptide
 - (4) DNA sequence which has continuous information for a polypeptide
29. Classical plant breeding involves
- (1) Improved management practices
 - (2) Domestication
 - (3) Hybridisation and selection
 - (4) More than one option is correct
30. Tissue culture technique applied for the recovery of healthy plants from diseased plants is
- (1) Somatic hybridisation
 - (2) Embryo culture
 - (3) Androgenic culture
 - (4) Meristem culture
31. The path of electrons through cytochrome oxidase in mitochondrial ETS is
- (1) $\text{NADH} \rightarrow \text{FMN} \rightarrow \text{Fe} - \text{S}$
 - (2) $\text{Cyt } b \rightarrow \text{Cyt } c_1$
 - (3) $\text{FAD} \rightarrow \text{Fe} - \text{S} \rightarrow \text{Q}$
 - (4) $\text{Cyt } a \rightarrow \text{Cyt } a_3$
32. The main source of biofertilisers in terrestrial environments are
- (1) Bacteria only
 - (2) Bacteria and fungi
 - (3) Fungi and BGA
 - (4) Bacteria, cyanobacteria and fungi
33. The ecological pyramid of number for predator food chain on a tree is
- (1) Straight (2) Inverted
 - (3) Spindle-shaped (4) Bell-shaped
34. Amongst vertebrates the diversity of amphibians (A), fishes (B), birds (C), reptiles (D), mammals (E) is correctly represented by
- (1) $B > C > A > D > E$
 - (2) $B > C > D > A > E$
 - (3) $B > D > C > A > E$
 - (4) $C > E > B > A > D$
35. Most effective device to remove particulate matter present in the exhaust released from a thermal power plant is
- (1) Scrubber
 - (2) Catalytic converters
 - (3) ESP
 - (4) CPCB

In the following questions (36 to 40), a statement of assertion (A) is followed by a statement of reason (R).

- (1) If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark **(1)**.
- (2) If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark **(2)**.
- (3) If Assertion is true statement but Reason is false, then mark **(3)**.
- (4) If both Assertion and Reason are false statements, then mark **(4)**.
36. A : Viruses did not find a place in the five kingdom classification of Whittaker.
R : They are non-cellular organisms with inert crystalline structure outside the living cell.
37. A : Diakinesis represents transition to Metaphase-I.
R : Diakinesis is marked by dissolution of Synaptonemal complex
38. A : An ovule generally has a single embryo sac formed from a megaspore.
R : Generally single megaspore mother cell is differentiated in the micropylar region of the nucellus.
39. A : Genetic codes are degenerate.
R : The code is nearly universal
40. A : Species inventories are more complete in tropical than in temperate countries.
R : A large number of species waiting to be discovered are in the temperate regions.





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MM : 160

**Sample Paper : Campus Recruitment Test
Botany (Medical)**

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

1	(4)	9	(4)	17	(3)	25	(2)	33	(3)
2	(1)	10	(3)	18	(4)	26	(4)	34	(2)
3	(3)	11	(1)	19	(2)	27	(3)	35	(3)
4	(2)	12	(1)	20	(2)	28	(4)	36	(1)
5	(3)	13	(3)	21	(1)	29	(3)	37	(3)
6	(3)	14	(1)	22	(3)	30	(4)	38	(2)
7	(1)	15	(3)	23	(2)	31	(4)	39	(2)
8	(4)	16	(1)	24	(4)	32	(4)	40	(4)



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MM : 120

Sample Paper : Campus Recruitment Test Chemistry (Engineering)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

Instructions:

- Use ball point pen only to darken the appropriate circle.
- Mark should be dark and should completely fill the circle.
- Dark only one circle for each entry.
- Dark the circle in the space provided only.
- Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
- Each question carries 3 marks. For every wrong response 1 mark shall be deducted from the total score.

Choose the correct answer :

- Ratio of number of moles of Cu to HNO_3 to give NO and NO_2 in the molar ratio of 2 : 1 is
 - 1 : 2
 - 2 : 1
 - 7 : 20
 - 20 : 7
- 1.0 g of metal nitrate gave 0.86 g of metal carbonate. Equivalent weight of metal is approximately
 - 167
 - 83.5
 - 62
 - 30
- Radial part of the wave function of e^- in an atomic orbital depends on
 - n, l
 - l , m
 - m
 - n, l , m
- What is the pressure exerted by 8.5 g of NH_3 contained in a 0.5 litre vessel at 300 K? [For ammonia, $a = 4.0 \text{ atm L}^2\text{mole}^{-2}$, $b = 0.036 \text{ L mole}^{-1}$]
 - 0.5 atm
 - 11.5 atm
 - 24.6 atm
 - 21.5 atm
- When ethyne is passed through a red hot tube then formation of benzene takes place
$$\Delta_f H^\circ (\text{C}_2\text{H}_2)_{(g)} = 230 \text{ kJ/mole}$$
$$\Delta_f H^\circ (\text{C}_6\text{H}_6)_{(g)} = 85 \text{ kJ/mole}$$
Calculate the standard heat of trimerisation of ethyne to benzene
 - 615 kJ/mole
 - 605 kJ/mole
 - 205 kJ/mole
 - 405 kJ/mole
- 40% of mixture of 0.2 mole N_2 and 0.6 mole H_2 reacts to give NH_3 according to the equation
$$\text{N}_2(g) + 3\text{H}_2(g) \rightleftharpoons 2\text{NH}_3(g)$$
at constant pressure. Then the ratio of the final volume to the initial volume of gases, is
 - 8 : 5
 - 7 : 10
 - 6 : 10
 - 4 : 5
- Solubility of zirconium (IV) phosphate in H_2O is
 - $\left(\frac{K_{\text{SP}}}{6912}\right)^{1/7}$
 - $\left(\frac{K_{\text{SP}}}{108}\right)^{1/5}$
 - $\left(\frac{K_{\text{SP}}}{4}\right)^{1/3}$
 - $\sqrt{K_{\text{SP}}}$

8. Which of the following doesn't produce H₂ gas on action of NaOH?

- (1) Be (2) Zn
(3) Al (4) Mg

9. Dimeric form of BeCl₂ is

- (1) Linear (2) Planar
(3) Pyramidal (4) Tetrahedral

10. The second ionization energy is maximum for

- (1) Beryllium (2) Boron
(3) Magnesium (4) Aluminium

11. Hydrolysis of XeF₂ produce

- | | | | |
|-----|------|----------------|------------------|
| Xe | HF | O ₂ | XeO ₃ |
| (I) | (II) | (III) | (IV) |
- (1) I, II, III (2) I, II, III, IV
(3) II, III, IV (4) I, IV, II

12. Geometrical isomerism can't be shown by

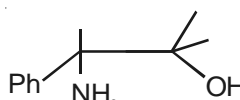
- (1) Pt (gly)₂ (2) Be(acac)₂
(3) Pt(NH₃)₂Cl₂ (4) Pd(Py)(NH₃)(Br)Cl

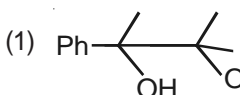
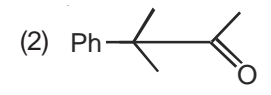
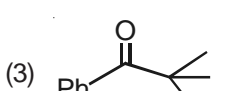
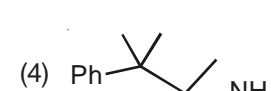
13. For the reaction A → B, the rate law expression

is $\frac{-d[H]}{dt} = k[A]^2$, if initial concentration of A is A₀

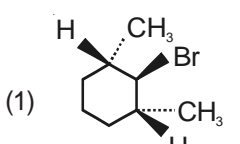
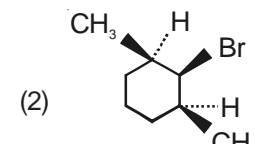
then half life of the reaction is given by

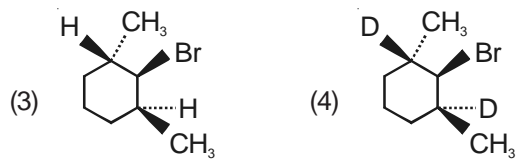
- (1) $\frac{\sqrt{2}(\sqrt{2}-1)A_0}{k}$ (2) $\frac{\sqrt{2}(\sqrt{2}-1)A_0^{1/2}}{k}$
(3) $\frac{2A_0}{k}$ (4) $\frac{(\sqrt{2}-1)A_0^{1/2}}{2k}$

14.  Major product is

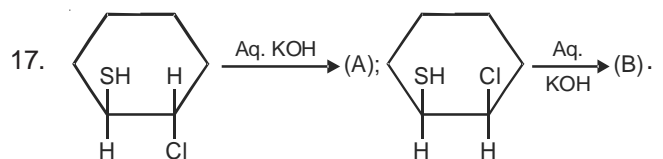
- (1)  (2) 
(3)  (4) 

15. Which species is more reactive towards E₂?

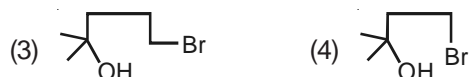
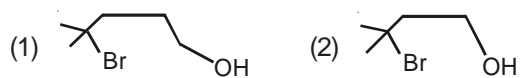
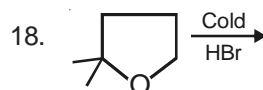
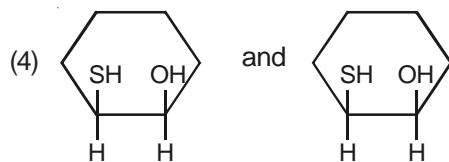
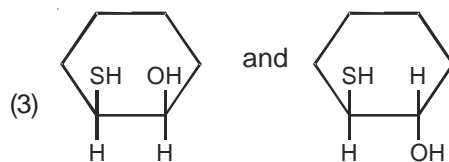
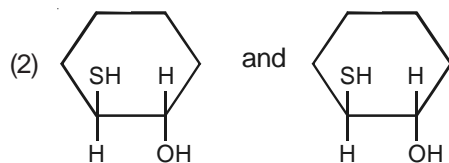
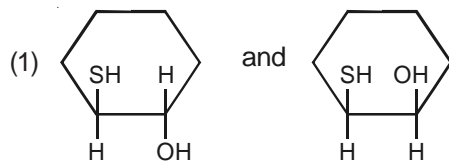
- (1)  (2) 



16. Maximum enol content is found in

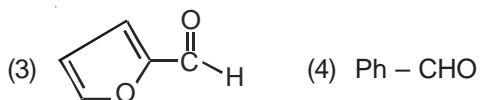


(A) and (B) are respectively



19. Which doesn't give Cannizzaro's reaction?

- (1) HCHO (2) CCl_3CHO



20. A reaction $\frac{1}{2}\text{H}_2 + \text{AgCl(s)} \rightleftharpoons \text{H}^{(+)}(\text{aq}) + \text{Cl}^{(-)} + \text{Ag(s)}$

occurs in a galvanic cell. The structure of the cell will be

- (1) $\text{Ag}|\text{AgCl(s)}|\text{KCl(solution)}|\text{AgNO}_3(\text{solution})|\text{Ag}$
(2) $\text{Pt}|\text{H}_2(\text{g})|\text{HCl(solution)}|\text{AgNO}_3|\text{Ag}$
(3) $\text{Pt}|\text{H}_2(\text{g})|\text{HCl(solution)}|\text{AgCl}|\text{Ag}$
(4) $\text{Pt}|\text{H}_2(\text{g})|\text{KCl(solution)}|\text{AgCl(s)}|\text{Ag}$

21. Solution of alkali metal in ammonia acts as a reducing agent due to the presence of ammoniated electrons. It cannot reduce

- (1) Non-terminal alkyne (2) Aromatic ring
(3) O_2 to O_2^{2-} (4) Non-terminal alkene

22. The molecule having the greatest number of similar bond angles is

- (1) PCl_5 (2) IF_7
(3) SF_6 (4) CH_4

23. For 2nd period elements, which of the following is correct for the observed order $\text{O} > \text{C} > \text{B} > \text{N}$?

- (1) Ionization energy
(2) Size
(3) Electron affinity
(4) Effective nuclear charge

24. Among the pair of complexes $[\text{Ni}(\text{CO})_4]$ and $\text{K}_2[\text{Ni}(\text{CN})_4]$, the property which is the same is

- (1) Magnetic moment
(2) Oxidation number of central metal
(3) Geometry
(4) EAN of central metal

25. KI is a reducing agent which is oxidised to give a dark brown precipitate which dissolves in excess of KI to give a clear yellow solution in the following process

- (1) Addition of excess of KI to NaNO_3 solution
(2) Addition of excess of KI to $\text{Bi}(\text{NO}_3)_3$ solution
(3) Addition of excess of KI to NaCl solution
(4) Addition of excess of KI to NH_3 solution

26. Blue solution of CuSO_4 on treatment with excess KCN gives a colourless solution due to

- (1) Formation of $\text{Cu}(\text{OH})_2$
(2) Formation of $[\text{Cu}(\text{CN})_4]^{2-}$
(3) Formation of CuCN
(4) Formation of $[\text{Cu}(\text{CN})_4]^{3-}$

27. Rubidium chloride crystallizing in NaCl type lattice has a unit cell edge length 30 pm greater than for the corresponding potassium salt ($r_{\text{K}^{\oplus}} = 133$ pm) of the same halogen having rock salt structure. Hence the ionic radius of Rb^+ is

- (1) 100 pm (2) 120 pm
(3) 148 pm (4) 170 pm

28. Three gases He, O_2 and CH_4 are under the same initial conditions of P, V, T. Each gas is separately expanded reversibly and adiabatically to double its initial volume. What is the decreasing order of magnitude of work done by the system in each case?

- (1) $W_{\text{He}} > W_{\text{O}_2} > W_{\text{CH}_4}$ (2) $W_{\text{CH}_4} > W_{\text{O}_2} > W_{\text{He}}$
(3) $W_{\text{O}_2} > W_{\text{CH}_4} > W_{\text{He}}$ (4) $W_{\text{O}_2} > W_{\text{He}} > W_{\text{CH}_4}$

29. For the disproportionation of ClO_3^- , the initial concentration of the reactant is 0.2 M and the reaction quotient at any time t is 0.1. Then the incorrect statement for the reaction



$$(E_{\text{ClO}_4^-/\text{ClO}_3^-}^\circ = 0.36 \text{ V and } E_{\text{ClO}_3^-/\text{ClO}_2^-}^\circ = 0.33 \text{ V})$$

- (1) E_{cell} is zero and the reaction is at equilibrium
(2) Equivalent weight of chlorate ion is equal to its ionic weight
(3) Concentration of chlorate ion at this time t is 0.02 M
(4) Concentration of perchlorate ion at this time t is 0.04 M

30. For the first order reaction $\text{P} \rightarrow \text{Q} + \text{R}$, carried out at 27°C, if $3.8 \times 10^{-16}\%$ of the reactant molecules exist in the activated state, the E_a of the reaction is nearly [$\log 3.8 = 0.58$, $R = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$]

- (1) 120 kJ/mole
(2) 831.4 kJ/mole
(3) 100 kJ/mole
(4) 91.2 kJ/mole

31. For a 3s orbital radial wave function (ψ) of electron,

$$\psi_{(3s)} = \frac{1}{9\sqrt{3}} \left(\frac{1}{a_0} \right)^{3/2} (6 - 6x + x^2) e^{-x/2}$$

where, $x = \frac{2rZ}{3a_0}$. The incorrect statement is

- (1) Number of radial nodes in this orbital is 2
- (2) Number of maxima in radial probability density curve are 3
- (3) Maximum distance of radial node from nucleus is $\frac{3(3 + \sqrt{3})a_0}{2Z}$
- (4) Distance between first and last radial node is equal to $\frac{9\sqrt{3}a_0}{2Z}$

32. 50 L of gaseous mixture of C_2H_4 , CO and N_2 gases having mass ratio 1 : 2 : 2 is taken in a eudiometric tube and exploded with 60 L of O_2 . The incorrect statement under NTP conditions is

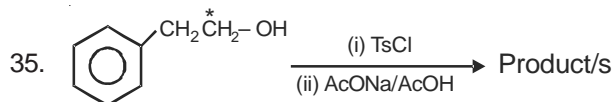
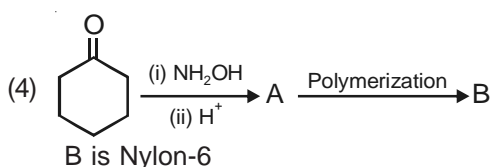
- (1) Volume contraction after reaction is 30 L
- (2) Volume of resulting gaseous mixture after passing through aqueous KOH is 50 L
- (3) Average molar mass of original gas mixture is 28
- (4) Original mixture will decolourize Baeyer's reagent

33. The correct statement about the product/s formed by acid catalysed hydration of ethyl vinyl ether is

- (1) All product/s give positive iodoform test
- (2) All product/s give positive Tollen's test
- (3) All product/s has double bond equivalent equal to 1
- (4) All product/s give characteristic nucleophilic substitution reactions

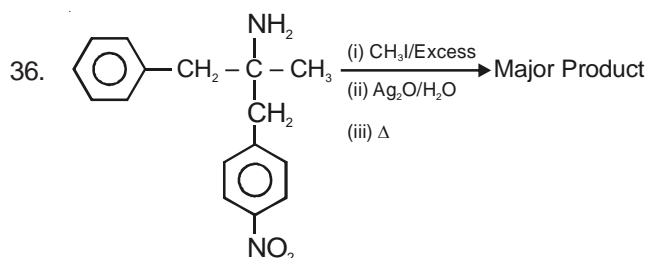
34. Polymers are macromolecules formed by combination of smaller units. Incorrect statement among the following is

- (1) Natural rubber is cis-polyisoprene and its monomer on reductive ozonolysis gives formaldehyde and CH_3COCHO
- (2) Vinylidene chloride ($CH_2 = CCl_2$) polymerise to give isotactic, syndiotactic and atactic forms
- (3) Anionic polymerisation is preferred in acrylonitrile

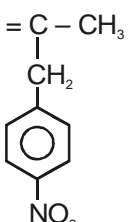
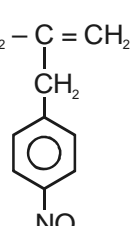
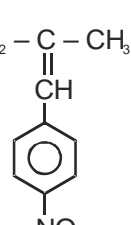
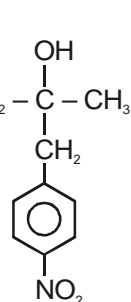


Correct statement about the products formed in above reaction is

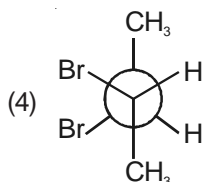
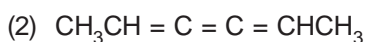
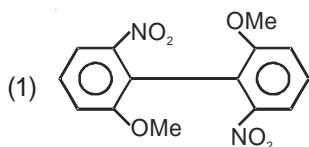
- (1) Two products with nearly equal amounts are formed
- (2) Two products with largely unequal amounts are formed
- (3) Products formed is/are ether
- (4) Type of reaction is electrophilic substitution



Major product is

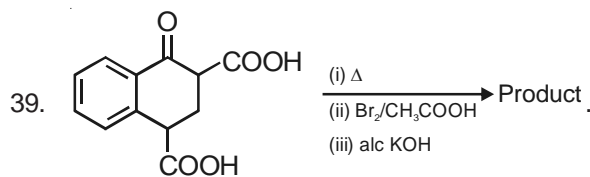
- (1) 
- (2) 
- (3) 
- (4) 

37. Which of the following is non-resolvable?



38. The incorrect statement among the following is

- (1) Methylamine and dimethylamine are distinguished by carbylamine test
- (2) Dimethylamine and trimethylamine can be distinguished by Libermann nitroso reaction
- (3) Aniline on nitration with HNO_3 and H_2SO_4 give substantial amount of m-nitroaniline
- (4) Methylamine in water reacts with FeCl_3 to give yellow precipitate



Product is not

- (1) A α - β unsaturated carbonyl
 - (2) Capable of releasing CO_2 from NaHCO_3
 - (3) Capable of giving electrophilic aromatic substitution reaction
 - (4) Having double bond equivalent value of 7
40. The reagent that converts acetaldehyde into $\text{C}(\text{CH}_2\text{OH})_4$ is
- (1) KOH
 - (2) KOH followed by LAH
 - (3) Excess of HCHO and KOH
 - (4) KCN followed by hydrolysis





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MM : 120

Sample Paper : Campus Recruitment Test
Chemistry (Engineering)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

- | | | | |
|---------|---------|---------|---------|
| 1. (3) | 11. (1) | 21. (4) | 31. (4) |
| 2. (1) | 12. (2) | 22. (3) | 32. (2) |
| 3. (1) | 13. (2) | 23. (3) | 33. (1) |
| 4. (4) | 14. (2) | 24. (1) | 34. (2) |
| 5. (2) | 15. (2) | 25. (2) | 35. (1) |
| 6. (4) | 16. (4) | 26. (4) | 36. (3) |
| 7. (1) | 17. (2) | 27. (3) | 37. (2) |
| 8. (4) | 18. (1) | 28. (2) | 38. (4) |
| 9. (2) | 19. (2) | 29. (3) | 39. (4) |
| 10. (2) | 20. (3) | 30. (3) | 40. (3) |



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MM : 160

Sample Paper : Campus Recruitment Test Time : 1½ Hr.
Chemistry (Medical)




Complete Syllabus of Class XI & XII

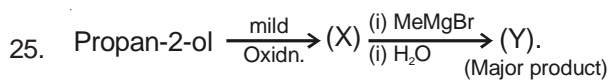
Instructions:

- Use ball point pen only to darken the appropriate circle.
- Mark should be dark and should completely fill the circle.
- Dark only one circle for each entry.
- Dark the circle in the space provided only.
- Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
- Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score.

Choose the correct answer :

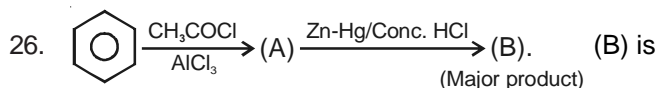
- Which of the following have same number of s-electrons as d-electrons in Fe^{2+} ?
(1) Li (2) Na
(3) N (4) P
- For a 'd' electron, the orbital angular momentum is
(1) $\sqrt{6} \hbar$ (2) $\sqrt{2} \hbar$
(3) \hbar (4) $2 \hbar$
- If there are no intermolecular forces of attraction then the volume occupied by the molecules of 4.5 kg of water at STP will be
(1) 4.5 m^3 (2) 11.2 m^3
(3) 22.4 m^3 (4) 5.6 m^3
- The reciprocal of viscosity is called
(1) Resistivity (2) Fluidity
(3) Density (4) Surface tension
- The oxidation number of phosphorous in P_4O_{10} and $\text{P}_2\text{O}_7^{4-}$ is
(1) +3 (2) +2
(3) +5 (4) -3
- The amount of hydrazine (N_2H_4) oxidised to N_2 by 19.4 g K_2CrO_4 which itself reduces to $\text{Cr}(\text{OH})_4^-$ is
(1) 2 g (2) 2.4 g
(3) 2.8 g (4) 3 g
- CuSO_4 solution is treated separately with KCl and KI. In which case Cu^{2+} will be reduced to Cu^+
(1) KCl (2) KI
(3) Both can reduce (4) None can reduce
- Standard electrode potentials of $\text{Fe}^{2+} + 2\text{e}^- \rightarrow \text{Fe}$ and $\text{Fe}^{3+} + 3\text{e}^- \rightarrow \text{Fe}$ are -0.44 volt and -0.036 volt respectively. The standard electrode potential for $\text{Fe}^{3+} + \text{e}^- \rightarrow \text{Fe}^{2+}$ will be
(1) -0.404 V (2) +0.404 V
(3) +0.772 V (4) -0.476 V
- The correct order of bond angle is
(1) $\text{PF}_3 < \text{PCl}_3 < \text{PBr}_3 < \text{PI}_3$
(2) $\text{PF}_3 < \text{PBr}_3 < \text{PCl}_3 < \text{PI}_3$
(3) $\text{PI}_3 < \text{PBr}_3 < \text{PCl}_3 < \text{PF}_3$
(4) $\text{PF}_3 > \text{PCl}_3 < \text{PBr}_3 < \text{PI}_3$

10. Which of the following species has triangular planar shape?
- (1) CH_3^+ (2) ClO_2^-
 (3) H_3O^+ (4) ClO_3^-
11. Yg of non-volatile organic substance of molecular mass M is dissolved in 250 g of benzene. If molal elevation constant of benzene is K_b , then elevation in its boiling point is given by
- (1) $\frac{M}{K_b Y}$ (2) $\frac{4K_b Y}{M}$
 (3) $\frac{K_b Y}{4M}$ (4) $\frac{K_b Y}{M}$
12. Which of the following statement/s is/are correct?
- (1) Gases having high critical temperature possess more tendency for adsorption
 (2) An adsorbent possesses more tendency for adsorption if it is in the colloidal state
 (3) Chemical adsorption first increases with increase in temperature and then decreases
 (4) All are correct
13. The rate of a chemical reaction depends upon
- (1) Temperature
 (2) Nature of reacting species
 (3) Concentration of reacting species
 (4) All of these
14. The reaction $A \rightarrow B$ is started with 10 g of A. After 30 and 90 min, 5 g and 1.25 g of A are left respectively. The order of reaction is
- (1) Zero (2) 1
 (3) 2 (4) 3
15. The degree of dissociation of $\text{PCl}_5(\alpha)$ for the equilibrium $\text{PCl}_5(\text{g}) \rightleftharpoons \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$ is approximately related to the pressure at equilibrium (P) by the relation $[\alpha \ll 1]$
- (1) $\alpha \propto P$ (2) $\alpha \propto \frac{1}{\sqrt{P}}$
 (3) $\alpha \propto \frac{1}{P^2}$ (4) $\alpha \propto \frac{1}{P^4}$
16. A weak acid HX ($K_a = 10^{-5}$) on reaction with NaOH gives NaX. For 0.1 M aqueous solution of NaX, the % hydrolysis is
- (1) 0.001% (2) 0.01%
 (3) 0.15% (4) 1%
17. Correct order of lattice energy of the given crystals is
- (1) $\text{KCl} < \text{NaCl} < \text{NaF}$ (2) $\text{NaF} > \text{KCl} > \text{NaCl}$
 (3) $\text{KCl} > \text{NaCl} > \text{NaF}$ (4) $\text{NaCl} > \text{KCl} > \text{NaF}$
18. Benzene reacts with iso-butyl chloride in the presence of anhyd. AlCl_3 to give (as a major product)
- (1) t-butylbenzene (2) Isobutylbenzene
 (3) n-butylbenzene (4) Sec-butylbenzene
19. Ethene is shaken with aqueous solution of Br_2 . Which of the following is the possible product?
- (1) $\begin{array}{c} \text{CH}_2-\text{Br} \\ | \\ \text{CH}_2-\text{Br} \end{array}$ (2) $\begin{array}{c} \text{CH}_2-\text{OH} \\ | \\ \text{CH}_2-\text{OH} \end{array}$
 (3) $\begin{array}{c} \text{CH}_2-\text{Br} \\ | \\ \text{CH}_2-\text{OH} \end{array}$ (4) All of these
20. How many enantiomeric pairs can be obtained by monobromination of iso-pentane?
- (1) 1 (2) 2
 (3) 3 (4) 4
21. Which of the following compound will not give ppt. with $\text{AgNO}_3(\text{aq})$?
- (1) - CH_2-Cl (2) $(\text{CH}_3)_3\text{CCl}$
 (3) $\text{CH}_3\text{CH}=\text{CH}-\text{Cl}$ (4) $\text{CH}_2=\text{CH}-\text{CH}_2-\text{Cl}$
22. Which of the following statement is not correct?
- (1) Alkyl iodides are heavier than water
 (2) Alkyl bromides are lighter than water
 (3) Ethyne reacts with excess HCl to form ethylidene dichloride
 (4) Vinyl chloride does not undergo nucleophilic substitution reaction readily
23. What amount of bromine will be required to convert 2 g of phenol into 2, 4, 6-tribromophenol?
- (1) 20.4 g (2) 10.2 g
 (3) 6.0 g (4) 4.0 g
24.  +  \rightarrow (A) $\xrightarrow{\text{H}_2\text{O}/\text{H}^+}$ (B). (Major product)
- (B) is
- (1) Benzyl alcohol (2) 2-phenylethanol
 (3) 1-phenylethanol (4) Quinol



(Y) is

- (1) Butan-2-ol (2) Butan-1-ol
(3) 2-methylpropene (4) 2-methylpropan-2-ol



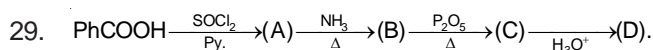
- (1) Ethylbenzene (2) Glyoxal
(3) Benzoic acid (4) Phenylethanol

27. A substance (X) containing 3 C-atoms gives white crystalline ppt. with sodium bisulphite solution but does not give red ppt. with Fehling's solution. (X) on treatment with $\text{NH}_2\text{-NH}_2/\text{KOH}$ will yield

- (1) Propane (2) Propene
(3) Cyclopropane (4) Propionic acid

28. One mole of ethylamine when reacts with nitrous acid produces dinitrogen gas at 0°C and 1 atmospheric pressure equal to

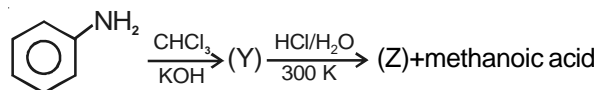
- (1) 22.4L (2) 1L
(3) 11.2L (4) 24.8L

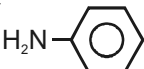
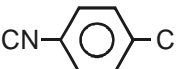

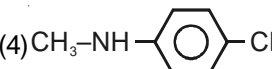


(D) as a major product is

- (1) Phenol (2) Benzoic acid
(3) Benzylamine (4) Cyclohexylamine

30. Identify (Z)



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

31. Which of the following is not an antipyretic?

- (1) Analgin (2) Morphine
(3) Aspirin (4) Phenacetin

32. Sodium hydroxide solution reacts with phosphorous to form phosphine. The reaction requires

- (1) White phosphorous and dil. NaOH
(2) White phosphorous and conc. NaOH
(3) Red phosphorous and dil. NaOH
(4) All of these

33. The correct order of increasing thermal stability of the given compounds is

- I. HF II. HBr
III. HCl IV. HI
(1) I < II < III < IV (2) IV < II < III < I
(3) IV < II < I < III (4) II < IV < I < III

34. Which of the following will not show geometrical isomerism?

- (1) $[\text{Co}(\text{ox})_3]^{3-}$ (2) $[\text{Co}(\text{en})_2\text{Cl}_2]\text{Cl}$
(3) $[\text{Cr}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ (4) Both (2) & (3)

35. Which one of the following has the highest paramagnetism?

- (1) $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$
(2) $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$
(3) $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}$
(4) $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$

36. A paste of compound 'X' in water is heated with ethanol. It gives a product which is used as an anaesthetic agent. 'X' is

- (1) KClO_3 (2) $\text{Ca}(\text{ClO}_3)_2$
(3) CaOCl_2 (4) KClO_4

37. Which oxoacid of phosphorous cannot act as a reducing agent?

- (1) H_3PO_2 (2) H_3PO_3
(3) H_3PO_4 (4) Both (1) & (2)

38. The geometries of $\text{Ni}(\text{CO})_4$ and $\text{Ni}(\text{PPh}_3)_2\text{Cl}_2$ are

- (1) Both square planar
(2) Tetrahedral and square planar respectively
(3) Both tetrahedral
(4) Square planar and tetrahedral respectively

39. The correct order of boiling points of noble gases is

- (1) $\text{He} < \text{Ne} < \text{Ar} < \text{Kr} < \text{Xe}$
(2) $\text{He} > \text{Ne} > \text{Ar} > \text{Kr} > \text{Xe}$
(3) $\text{He} < \text{Ne} < \text{Kr} < \text{Ar} < \text{Xe}$
(4) $\text{He} < \text{Ne} < \text{Ar} < \text{Xe} < \text{Kr}$

40. Which compound of nitrogen produces nitrogen gas on heating?

- (1) NH_4NO_2 (2) $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$
(3) $\text{Ba}(\text{N}_3)_2$ (4) All of these





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MM : 160

Sample Paper : Campus Recruitment Test
Chemistry (Medical)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

- | | | | |
|---------|---------|---------|---------|
| 1. (4) | 11. (2) | 21. (3) | 31. (2) |
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| 8. (3) | 18. (1) | 28. (1) | 38. (2) |
| 9. (4) | 19. (4) | 29. (2) | 39. (1) |
| 10. (1) | 20. (1) | 30. (1) | 40. (4) |



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Sample Paper : Campus Recruitment Test Time : 1½ Hr.
Physics (Medical)

Complete Syllabus of Class XI & XII

Instructions:

- (i) Use ball point pen only to darken the appropriate circle.
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- (iii) Dark only one circle for each entry.
- (iv) Dark the circle in the space provided only.
- (v) Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
- (vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score.

Choose the correct answer :

1. The dimension of $\frac{L}{RCV}$ is

(1) [AT]	(2) [A ⁻¹ T ⁰]
(3) [A ² T]	(4) [AT ⁻²]

2. Which of the following equations is dimensionally correct?

(1) $T = 2\pi\sqrt{\frac{Gm}{R^2}}$	(2) $T = 2\pi\sqrt{\frac{R^2}{Gm}}$
(3) $T = 2\pi\sqrt{\frac{R^3}{Gm}}$	(4) $T = 2\pi\sqrt{\frac{Gm}{R^3}}$

3. The position vector of a moving particle is given as $\vec{r} = a\cos\omega\hat{i} + b\sin\omega\hat{j}$. Then its radial acceleration is given as

(1) $\omega^2\vec{r}$	(2) $\omega\vec{r}$
(3) $-\omega^2\vec{r}$	(4) $\omega\vec{r}^2$

4. A uniform thick rope of length 10 m is resting on a horizontal frictionless surface. It is pulled by a force of 5 N at one end. Then what is the tension in the rope at 2 m from the end where the force is applied?

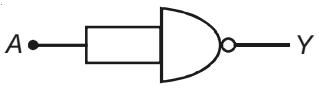
(1) 6 N	(2) 8 N
(3) Zero	(4) 4 N

5. A car of mass (m) accelerates, starting from rest, while the engine supplies constant power P . Then velocity varies with time (t) as

(1) $v \propto t$	(2) $v \propto t^{1/2}$
(3) $v \propto t^2$	(4) $v \propto t^{3/2}$

6. Assuming the radius of earth R and acceleration due to gravity at its surface is g . If a body of mass (m) is sent to a height, $h = \frac{R}{3}$ from the earth's surface. The P.E. increases by

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

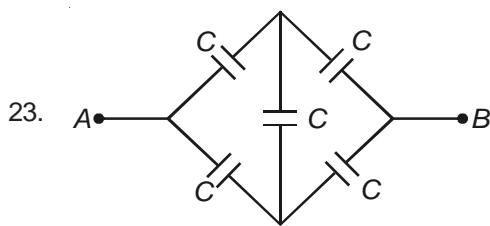
7. The position (x) of a particle varies with time as $t = \alpha x^2 + \beta x$, then acceleration of particle is
- (1) $2\beta v^3$ (2) $2\alpha v^3$
 (3) $-2\beta v^3$ (4) $-2\alpha v^3$
8. A projectile has same range for two angles of projections from horizontal. If greatest heights achieved by projectile in two cases are h_1 and h_2 , then
- (1) $R = h_1 \cdot h_2$ (2) $R = \sqrt{h_1 \cdot h_2}$
 (3) $R = h_1^2 \cdot h_2^2$ (4) $R = 4\sqrt{h_1 \cdot h_2}$
9. The distance covered by a body projected vertically upward during first second of its descent is
- (1) 6 m (2) 4 m
 (3) 4.9 m (4) 1 m
10. 
- Logic gate shown in the figure represents
- (1) NAND gate (2) NOT gate
 (3) OR gate (4) NOR gate
11. If momentum of a particle is increased by 3%, then, percentage change in kinetic energy will be
- (1) 4% (2) 6%
 (3) 2% (4) 1%
12. Three point masses (m) are brought from infinity to be placed at the vertices of an equilateral triangle of side L . Then amount of work done is
- (1) $\frac{Gm^2}{L}$ (2) $\frac{-3Gm^2}{L}$
 (3) $\frac{3Gm^2}{L}$ (4) $\frac{-Gm^2}{L}$
13. If the coefficient of friction between an ANT and hemispherical bowl is μ and radius of bowl is R , then upto what maximum height ANT may crawl?
- (1) $R \left[1 + \frac{1}{\sqrt{1+\mu^2}} \right]$ (2) $R \left[1 - \frac{1}{\sqrt{1+\mu^2}} \right]$
 (3) $\frac{\sqrt{1+R^2}}{\mu}$ (4) $\frac{\sqrt{1+R^2}}{R\mu}$
14. A body starts from rest and acquires a velocity (v) in time (t). Then work done on body in time (T) is proportional to
- (1) $\frac{v}{t}$ (2) $\frac{v^2}{t^2} \cdot (T)$
 (3) $\frac{v^2}{t^2} \cdot (T)^2$ (4) $\frac{v^2}{t} \cdot T^2$
15. Angle between instantaneous electric field and magnetic field of electromagnetic wave is
- (1) π (2) Zero
 (3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$
16. Two different bodies of masses M_1 and M_2 are dropped from the same height. Then, ratio of their momenta on reaching the ground is
- (1) $\sqrt{\frac{M_1}{M_2}}$ (2) 1 : 1
 (3) $\frac{M_1}{M_2}$ (4) $\left(\frac{M_1}{M_2} \right)^2$
17. Above Curie temperature a ferromagnetic substance behaves
- (1) Ferromagnetic (2) Paramagnetic
 (3) Diamagnetic (4) All of these
18. The radius of gyration of uniform rod of length ' L ' about an axis passing through its CM and perpendicular to its length is
- (1) $\frac{L}{12}$ (2) $\frac{L}{\sqrt{12}}$
 (3) $\frac{L}{\sqrt{13}}$ (4) $\frac{L}{2}$
19. A flywheel rolls down on an inclined plane. At any instant of time, ratio of rotational kinetic energy to the total kinetic energy is
- (1) 1 : 3 (2) 2 : 3
 (3) 3 : 1 (4) 3 : 5
20. The depth $d (\ll R)$ at which the value of acceleration due to gravity becomes $\frac{1}{x}$ times, the value at the surface is
- (1) $\frac{R(x-1)}{R}$ (2) $\frac{R(x-1)}{x}$
 (3) $\frac{R \cdot x}{x-1}$ (4) $\frac{R}{x}$

21. The excess pressure inside one soap bubble is four times the excess pressure in other. Then, ratio of their surface areas is

- (1) $\frac{1}{4}$ (2) $\frac{3}{16}$
 (3) $\frac{4}{1}$ (4) $\frac{1}{16}$

22. If O_2 has root-mean square speed of C m/s, then root mean square speed of H_2 at same temperature will be

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



Capacity of the arrangement across AB as shown in figure

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

24. The frequency of a tuning fork with an amplitude $A = 1$ cm is 250 Hz. Then maximum velocity of any particle in air is

- (1) 2π m/s (2) 5π m/s
 (3) $\frac{3.3}{\pi}$ m/s (4) $\frac{2}{\pi}$ m/s

25. The phase difference between the instantaneous velocity and acceleration of a particle executing SHM is

- (1) π (2) Zero
 (3) $\frac{\pi}{2}$ (4) $\frac{2\pi}{3}$

26. How much electric flux will come out through a surface $\vec{S} = 10\hat{j}$ kept in an electric field

$$\vec{E} = 3\hat{i} + 2\hat{j} + \hat{k}?$$

- (1) 30 (2) 20
 (3) 10 (4) 60

27. An electron of mass (m) and charge (e) is accelerated from rest through a potential difference (V) in vacuum. Its final speed will be

- (1) $\sqrt{\frac{eV}{m}}$ (2) $\sqrt{\frac{2eV}{m}}$
 (3) $\sqrt{\frac{eV}{2m}}$ (4) $\frac{eV}{m}$

28. The potential of an electric field $\vec{E} = y\hat{i} + x\hat{j}$ is a function of

- (1) xy (2) $x + y$
 (3) $x^2 + y^2$ (4) x^2y

29. Two copper wires of length 1 m and the other of length 9 m have same resistance. Then diameter are in the ratio

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

30. The ratio of heat developed in three wires having lengths in the ratio 1 : 5 : 8 and radii 1 : 2 : 3 in parallel combination

- (1) 1 : 25 : 64
 (2) 1 : 4 : 9
 (3) 40 : 32 : 45
 (4) 45 : 32 : 40

31. The flux linked with a coil at an instant is given by $\phi = 5t^2 - 5t + 6$. Then induced emf at $t = 4$ second is

- (1) -10 V (2) 35 V
 (3) -35 V (4) 20 V

32. The inductive reactance of an inductor coil of $\frac{2}{\pi}$ H at 100 Hz is

- (1) 50Ω (2) $\frac{50}{\pi} \Omega$
 (3) 400Ω (4) $\frac{400}{\pi} \Omega$

33. If a convex lens of focal length 80 cm and a concave lens of focal length 50 cm are combined together, then, power of combination
- (1) 76.8 D (2) -0.75 D
 (3) 7.5 D (4) 3.25 D
34. A plano-convex lens of focal length 20 cm silvered at the plane surface will behave as a convergent mirror of focal length
- (1) 20 cm (2) 40 cm
 (3) 30 cm (4) 10 cm
35. In a Young's double slit experiment, 12 fringes are observed to be formed in a certain region of screen when a light of wavelength 600 nm is used. If a light of 200 nm is used, then number of fringes observed in same region is
- (1) 30 (2) 36
 (3) 12 (4) 20
36. A radioactive source has half-life of 2 hours emits radiation of intensity which is 64 times, the permissible safe level. Then, after how much time it would be possible to work safely with this source?
- (1) 12 hrs (2) 24 hrs
 (3) 6 hrs (4) 120 hrs
37. Bohr's radius of the H-atom in the ground state is 0.529 Å. What is the Bohr's radius of H-atom in first excited state?
- (1) 0.529 Å (2) 1.058 Å
 (3) 2.116 Å (4) 0.265 Å
38. The wavelength associated with an electron accelerated from rest through a PD of 1000 V is
- (1) 2.388 Å (2) 0.388 Å
 (3) 1.488 Å (4) 0.483 Å
39. A photodetector used to detect the wavelength of 1700 nm, has energy gap of about
- (1) 0.73 eV (2) 0.03 eV
 (3) 1.2 eV (4) 1.16 eV
40. A proton and an α -particle having same kinetic energy are fired through a magnetic field. If r_1 and r_2 respectively be the radii of their circular paths, then $\frac{r_1}{r_2} =$
- (1) 1 (2) 2
 (3) $\sqrt{2}$ (4) $\frac{1}{2}$





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MM : 160

Sample Paper : Campus Recruitment Test
Physics (Medical)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

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Sample Paper : Campus Recruitment Test Time : 1½ Hr.
Zoology (Medical)

Complete Syllabus of Class XI & XII

Instructions:

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- (vi) Each question carries 4 marks. For every wrong response 1 mark shall be deducted from the total score.

Choose the correct answer :

1. Which of the following character cannot be related to ctenophora?
 - (1) Comb like ciliary plates for swimming
 - (2) Mesogloea with amoebocytes and smooth muscle cells
 - (3) Special adhesive cells, the colloblasts
 - (4) Statocyst for equilibrium on oral side
2. Which of the following is limbless amphibian with scales embedded in skin?
 - (1) *Necturus*
 - (2) *Proteus*
 - (3) *Ichthyophis*
 - (4) *Alytes*
3. Crypts of Lieberkuhn – intestinal glands in the human ileum are
 - (1) Simple straight tubular
 - (2) Compound tubular gland
 - (3) Simple saccular glands
 - (4) Simple branched tubular
4. Which of the following is the longest segment present in the leg of *Periplaneta*?
 - (1) Coxa
 - (2) Femur
 - (3) Tibia
 - (4) Trochanter
5. Uridine is
 - (1) Base
 - (2) Base + sugar
 - (3) Base + phosphate
 - (4) Base + sugar + phosphate
6. Which of the following enzyme is not present in the pancreatic secretion?
 - (1) Amylopsin
 - (2) Steapsin
 - (3) Trypsinogen
 - (4) Nucleosidase

7. Contraction of which of the following breathing muscle is related to forceful expiration only?
- (1) Diaphragm (phrenic muscle)
 - (2) External intercostal muscles
 - (3) Pharyngeal muscle
 - (4) Internal intercostal muscle
8. Which of the following features do not make the echinoderms closer to chordates?
- (1) Adult anus derived from embryonic blastopore
 - (2) Enterocoelous coelom
 - (3) Mesodermal endoskeleton made up of calcareous plates
 - (4) Larva shows bilateral symmetry whereas radial symmetry in adult
9. Each fasciculus (bundle of nerve fibre) is surrounded by a layer of connective tissue is called
- (1) Epineurium (2) Perineurium
 - (3) Endoneurium (4) Neurilemma
10. In case of B-DNA, at each step of ascent the strand turns at _____ angle and the rise per base pair would be _____.
- (1) 360° and 34 Å (2) 36° and 3.4 Å
 - (3) 40° and 3.7 Å (4) 30° and 2.8 Å
11. Maximum volume of air that can be inspired by a person after normal expiration is
- (1) Inspiratory capacity
 - (2) Functional residual capacity
 - (3) Vital capacity
 - (4) Expiratory capacity
12. If the vagus nerve is decapitated, the heart beat will
- (1) Increase (2) Decrease
 - (3) Show no change (4) Be arrhythmic
13. Which of the following is not considered as function of parasympathetic nervous system?
- (1) Dilates arteries, lowers blood pressure
 - (2) Accelerate peristalsis
 - (3) Dilation of pupil
 - (4) Increases blood flow towards kidney
14. Which contraceptive method is effective at preventing fertilization and protecting against transmission of sexually transmitted disease?
- (1) Oral contraceptives
 - (2) Diaphragm
 - (3) Femidom
 - (4) Intra uterine device (IUD)
15. Most addictive narcotic is
- (1) Codeine (2) Pethidine
 - (3) Heroin (4) Bhang
16. In which cells of the patient, the functional ADA gene is introduced as a part of the treatment of SCID?
- (1) Erythrocytes (2) Lymphocytes
 - (3) Platelets (4) Liver cells
17. The reason to legalise conditional MTPs by the government of India is
- (1) To decrease the population growth rate
 - (2) To check indiscriminate and illegal male foeticide
 - (3) To check illegal female foeticides which are reported to high in India
 - (4) To check pregnancies
18. Infection of anti-gas gangrene serum (AGS) provide
- (1) Natural active immunity
 - (2) Natural passive immunity
 - (3) Artificial active immunity
 - (4) Artificial passive immunity
19. Which substance increases in concentration in the blood of the person who is smoking cigarettes?
- (1) Adrenaline (2) Acetylcholine
 - (3) GABA (4) Both (1) & (3)
20. To which of the following techniques would you associate the phenomenon of insertional inactivation?

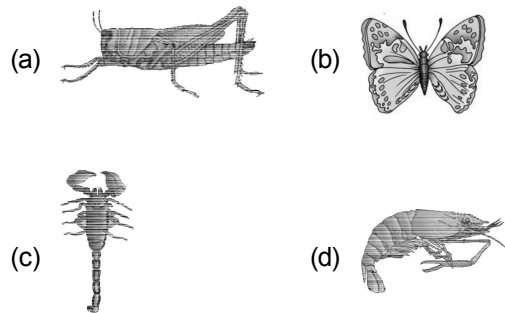
- (1) Southern Blotting
- (2) Northern Blotting
- (3) Selection of Recombinants
- (4) Microprojection

21. Which of the following is the direct method of gene transfer?

- A. Plasmid
- B. Bacteriophages
- C. Cosmids
- D. Chemical mediated genetic transformation

- (1) C only (2) A & B
- (3) A, B & C (4) D only

22. Which amongst the following animals given in the figure do not have compound eyes?



23. The closing of semilunar valves does not coincide with

- (1) Fall in ventricular pressure
- (2) Ventricular relaxation
- (3) Backflow of blood into the atria from ventricles
- (4) Creation of dup sound

24. Red muscles fibres are not characterised by

- (1) Plenty of mitochondria
- (2) High myoglobin content
- (3) Infatigability
- (4) More extensive sarcoplasmic reticulum

25. The regulation of sexual behaviour, expression of emotional reactions and motivation is the function of

- (1) Corpora quadrigemina
- (2) Basal ganglia
- (3) Limbic system
- (4) Cerebrum and hypothalamus

26. Damage of suspensory ligaments of eye will affect

- (1) Adaptation ability of eye
- (2) Ability to absorb dazzling effect of light
- (3) Accommodation property of eye
- (4) The texture of lens

27. The cristae and maculae are collectively termed as

- (1) Otolith organ
- (2) Baroreceptors
- (3) Labyrinthine receptors
- (4) Statoacoustic organ

28. Which ovarian hormone is responsible for appearance of public hair in female?

- (1) Leutenising hormone
- (2) Oestrogen
- (3) Progesterone
- (4) Gonadotropins

29. Which sexually transmitted disease is characterised by foul smelling vaginitis with yellowish discharge in females and is treated by administration of metronidazole?

- (1) Chlamydia
- (2) Chancroid
- (3) Trichomoniasis
- (4) Gonorrhoea

30. Mark the odd one w.r.t adaptive convergence

- (1) *Lemur* and *Spotted cuscus*
- (2) *Flying squirrel* and *flying Phalanger*
- (3) *Koala* and *Bandicoot*
- (4) *Wolf* and *Tasmanian wolf*

31. Acid in the stomach, saliva in the mouth, tears from eyes all are examples of

- (1) Cellular barriers
- (2) Physiological barriers
- (3) Physical barriers
- (4) Cytokine barriers

32. Which type of antibody remains attached to mucus membranes of the body?

- (1) IgA
- (2) IgM
- (3) IgD
- (4) IgG

33. Mark the correct combination of drugs which quickly reduce the symptoms of allergy
- (1) Histamine, Serotonin, Heparin
 - (2) Antihistamine, adrenaline, steroids
 - (3) Adrenaline, noradrenaline, histamine
 - (4) Interferon, adrenaline, steroids
34. A patient with severe burn injuries when brought to the hospital will be most probably injected with _____ as a first aid.
- (1) LSD
 - (2) Morphine
 - (3) Atropine
 - (4) Cocaine
35. In the maturation of proinsulin to insulin after removal of C peptide. A and B chain are linked by
- (1) Hydrogen bond
 - (2) Disulphide bond
 - (3) Ionic bond
 - (4) Electrostatic force
36. Ti plasmid of *Agrobacterium tumefaciens* has been modified into cloning vector because now it is
- (1) Non-pathogenic to plants
 - (2) Still able to use the mechanisms to deliver genes of our interest in variety of plants
 - (3) Its insert capacity is 15-30 kbp
 - (4) All of these
37. Mark the statement that is **incorrect** for loop of Henle
- (1) It plays a very important role in the maintenance of high osmolarity of medullary interstitium
 - (2) Its ascending limb is impermeable to water and electrolytes
 - (3) It is longer in juxtamedullary nephrons than cortical
 - (4) This region is known for minimum reabsorption of water
38. Change in frequency of alleles in a population would be expected if it
- (1) Shows no genetic drift
 - (2) Shows no recombination
 - (3) Undergo mutations which are selected by nature
 - (4) Shows no gene flow
39. Use of IUDs within 72 hours of coitus, as emergency contraceptive is mainly aimed at
- (1) Preventing sperm ascent
 - (2) Preventing mating of sperm and ovum
 - (3) Preventing implantation
 - (4) Killing of sperms
40. The signals for parturition originate from the _____ **A** _____ and _____ **B** _____, which induce mild uterine contraction called foetal ejection reflex.
- | A | B |
|-----------------------------|----------|
| (1) Mother uterus | Placenta |
| (2) Fully developed foetus | Placenta |
| (3) Partly developed foetus | Decidua |
| (4) Partly developed foetus | Yolk sac |





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MM : 160

Sample Paper : Campus Recruitment Test Time : 1½ Hr.
Zoology (Medical)

Complete Syllabus of Class XI & XII

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MM : 120

Sample Paper : Campus Recruitment Test Mathematics (Engineering)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

Instructions:

- Use ball point pen only to darken the appropriate circle.
- Mark should be dark and should completely fill the circle.
- Dark only one circle for each entry.
- Dark the circle in the space provided only.
- Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
- Each question carries 3 marks. For every wrong response 1 mark shall be deducted from the total score.

Choose the correct answer :

- Let $f : R \rightarrow A$ defined by $f(x) = [x - 4] + [6 - x]$, $[.]$ denotes the greatest integer function. Then
 - f is many one and even function
 - f is onto if $A = I$ (set of integers)
 - f is many one and odd function
 - f is one-one and odd function
- If for a function $f(x)$, $f(3) = 4$, $f'(3) = 5$, then $\lim_{x \rightarrow 3} [f(x)]$, ($[.]$ denotes the greatest integer function)
 - Is equal to 3
 - Is equal to 4
 - Is equal to 5
 - Does not exist
- Let a_1, a_2, \dots, a_{10} be 10 non-negative real number such that $a_1 + a_2 + \dots + a_{10} = 12$ and $S = a_1a_2 + a_2a_3 + a_3a_4 + \dots + a_9a_{10}$. Then
 - $S \leq 36$
 - $S > 144$
 - $S < 18$
 - $S > 72$
- If the sine of angles of a triangle ABC satisfy the equation $c^3x^3 - c^2(a + b + c)x^2 + \lambda x + \mu = 0$ (where a, b, c are the sides of a triangle ABC), then the triangle ABC is
 - Always right angled for any real value of λ, μ
 - Right angled only when $\lambda = c(ab + bc + ca)$, $\mu = -abc$
 - Right angled only when $\lambda = \frac{c(ab + bc + ca)}{4}$, $\mu = \frac{-abc}{8}$
 - Never right angled
- If α and β are non-real, then the condition for $x^2 + \alpha x + \beta = 0$ to have a real root is
 - $(\alpha - \bar{\alpha})(\beta - \bar{\beta}) = (\alpha\bar{\beta} - \bar{\alpha}\beta)^2$
 - $(\bar{\alpha} - \alpha)(\alpha\bar{\beta} - \bar{\alpha}\beta) = (\beta - \bar{\beta})^2$
 - $(\beta - \bar{\beta})(\alpha\bar{\beta} - \bar{\alpha}\beta) = (\alpha - \bar{\alpha})^2$
 - $(\alpha - \bar{\alpha})(\beta - \bar{\beta}) = (\alpha\bar{\beta} + \bar{\alpha}\beta)^2$

6. If $f(x) = \frac{x-1}{x+1}$, $f^2(x) = f(f(x))$, $f^{k+1}(x) = f(f^k(x))$

$k = 1, 2, 3, \dots$, and $g(x) = f^{1922}(x)$, then

$\int_{\frac{1}{e}}^1 g(x) dx$ is equal to

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

7. If $(1 + x + x^2)^n = a_0 + a_1x + a_2x^2 + \dots + a_{2n}x^{2n}$; $n \geq 14$, then the value of the determinant

$$\begin{vmatrix} a_{n-3} & a_{n-1} & a_{n+1} \\ a_{n-6} & a_{n-3} & a_{n+3} \\ a_{n-14} & a_{n-7} & a_{n+7} \end{vmatrix}$$

- (1) Is always positive (2) Is always negative
(3) Is zero (4) Can't be predicted

8. Let P_n denotes the product of all the coefficients of $(1 + x)^n$ and $10! P_{n+1} = 11^n \cdot P_n$, then n is equal to

- (1) 9 (2) 10
(3) 11 (4) 13

$$\sum_{r=0}^{k-1} x^{2r}$$

9. If $\frac{\sum_{r=0}^{k-1} x^{2r}}{\sum_{r=0}^{k-1} x^r}$ is a polynomial in x ; p and q are any two

values of k , then the roots of the equation $3x^2 + px + 5q = 0$ cannot be

- (1) Real (2) Imaginary
(3) Rational (4) Irrational

10. Let z be a non-zero complex number.

If $|z - 3 - 2i| = |z| \sin\left(\frac{\pi}{4} - \arg z\right)$, then the locus of

z is

- (1) A pair of straight lines
(2) Circle
(3) Parabola
(4) Ellipse

11. Let N be any five digit number say $x_1x_2x_3x_4x_5$.

Then the maximum value of $\frac{N}{x_1 + x_2 + x_3 + x_4 + x_5}$ is equal to

- (1) 10000 (2) $\frac{11111}{5}$
(3) 8000 (4) 11111

12. Let $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = x_1\hat{i} + x_2\hat{j} + x_3\hat{k}$,

where $x_1, x_2, x_3 \in \{-3, -2, -1, 0, 1, 2\}$. Number of possible vector \vec{b} such that \vec{a} and \vec{b} are mutually perpendicular, is

- (1) 22 (2) 24
(3) 25 (4) 30

13. For the series 21, 22, 23, ..., $k-1$, k , the A.M. and G.M. of the first and the last number exists in the given series. If k is a three digit number, the number of possible values of k is

- (1) 5 (2) 6
(3) 2 (4) 4

14. The number of solutions of the equation

$m \cos^{-1} x + \cos^{-1}(1-x) = \frac{n\pi}{2}$, where $m > 0$, $n \leq 0$, is

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

15. Let $f(x) = \sin 2\pi x + x - [x]$ ($[.]$ denotes the greatest integer function). Then the number of points in $[0, 10]$ at which $f(x)$ assumes its local maximum value is

- (1) 0 (2) 10
(3) 9 (4) 20

16. Five different digits from the set of numbers $\{1, 2, 3, 4, 5, 6, 7\}$ are written in random order. The probability that 5 digit number thus formed is divisible by 9, is

- (1) $\frac{2}{21}$ (2) $\frac{4}{21}$
(3) $\frac{8}{21}$ (4) $\frac{10}{21}$

17. The reflection of the point $(2t + 1, t)$ in a line is $(t - 1, 2t + 2)$. Then the equation of the line can be

- (1) $x = y + 1$ (2) $x = y - 1$
(3) $x = 2y + 1$ (4) $x = 2y - 1$

18. The area bounded between the tangents, drawn to the circle $x^2 + y^2 = 4$ at its points of intersection

with the curve $y = \sqrt{3}|x|$ is $\left(\frac{A}{C} - B\pi\right)$ sq. units.

Then the value of $(A + C^2 - 3B)$ is equal to

- (1) 9 (2) 6
(3) 7 (4) 8

19. Suppose the number of elements in set A is p , the number of elements in set B is q , and the number of elements in set $(A \times B)$ is 13. Then $p^2 + q^2$ is equal to
- (1) 170 (2) 130
(3) 120 (4) 140
20. For each of two data sets, each of size 4, the variance are given to be 3 and 4 and corresponding means are given to be 2 and 3 respectively. The variance of the combined data is equal to
- (1) $\frac{11}{4}$ (2) $\frac{15}{4}$
(3) 5 (4) $\frac{13}{4}$
21. If $\operatorname{cosec}x\sqrt{1-\cos^2x} + \sec x\sqrt{1-\sin^2x} = 0$ and $x \in (0, 2\pi)$, then the number of integral values of ' x ' is
- (1) 4 (2) 5
(3) 6 (4) 7
22. The minimum value of $y = \sec x + \operatorname{cosec}x$ in $(0, 1]$ is
- (1) $\sqrt{2}$ (2) $2\sqrt{2}$
(3) $3\sqrt{2}$ (4) $4\sqrt{2}$
23. The product of roots of the equation $(\log_2 x)^2 - 3\sqrt{(\log_2 x)^2} + 2 = 0$ is
- (1) 1 (2) 4
(3) 8 (4) 2
24. Let $|z^4 - 1| = |z|^4 + 1$, where z is a complex number then argument of z may be
- (1) $\frac{\pi}{6}$ (2) $\frac{\pi}{3}$
(3) $\frac{\pi}{2}$ (4) $\frac{\pi}{4}$
25. Let $f(x) = \sqrt{(3x-x^2-2)}$ is a real valued function and $[]$ and $\{ \}$ represents greatest integer function and fractional function respectively then the number of integers in the domain of $f([x]^2 + 2x - 2\{x\} + 6)$ is
- (1) 5 (2) 1
(3) 0 (4) 3
26. Consider A, B, C, D are four collinear points on a horizontal plane. The angle of elevation of a tower situated at point D from A, B, C is $\alpha-\beta, \alpha+\beta$ and 2α respectively. If $AB = BC = CD = 1$, then the height of the tower is
- (1) 4 (2) 3
(3) 2 (4) 1
27. The number of five digit numbers using 2, 3, 4, 5 only such that the sum of digits 23, is
- (1) 15 (2) 5
(3) 10 (4) 20
28. If $C_0, C_1, C_2, C_3, \dots, C_n$ are the binomial coefficients in the expansion of $(1+x)^n$ then the value of $2C_1 + (2.2^2)C_2 + (3.2^3)C_3 + (4.2^4)C_4 + \dots + (n.2^n)C_n$ is
- (1) $2n.5^{n-1}$ (2) 2^n
(3) $2n.3^{n-1}$ (4) $2n.4^{n-1}$
29. Two harmonic means H_1, H_2 are inserted between two numbers whose arithmetic mean is A and geometric mean is G . If the arithmetic mean of H_1, H_2 is ' h ' and geometric mean is ' g ' then the value of $\left(\frac{hG^2}{g^2A}\right)$ is
- (1) 2 (2) 1
(3) 3 (4) 4
30. The point (α, α) lies inside the triangle formed by the lines $x=0, y=0, x+y=2$ then the number of integral values of ' α ' is
- (1) 1 (2) 2
(3) 3 (4) 0
31. The tangents from origin to the circle $x^2 + y^2 - 4x - 4y + 4 = 0$ meet the circle at A and B . The radius of the circle passing through A, B and $(1, 0)$ is
- (1) $\sqrt{\frac{3}{2}}$ (2) $\sqrt{\frac{5}{2}}$
(3) $\sqrt{\frac{7}{2}}$ (4) $\sqrt{\frac{11}{2}}$
32. Tangents PA, PB are drawn to parabola $y^2 - 4x - 2y + 5 = 0$ from $P(0, 1)$. The locus of centre of the ellipse whose major and minor axes are of constant length and which touches the tangents PA and PB , is
- (1) Circle (2) Parabola
(3) Straight line (4) Hyperbola

33. The number of solution(s) of the equations
 $-4x + y + z = 2$... (i)
 $2x - 2y + z = 3$... (ii)
 $2x + y - 2z = 1$... (iii)
 is
 (1) 0 (2) 1
 (3) 2 (4) Infinite
34. Let $f : R \rightarrow R$ and $f(x+2) + f(x) = f(x+1)$ and
 $g(x) = f(x) - f(x+36) + x^3 + x^2 + x + 1$, where
 $x \in R$ then
 (1) $g(x)$ is continuous only for some values of x
 (2) $g(x)$ is differentiable only for some values of x
 (3) $g(x)$ is continuous but not differentiable
 (4) $g(x)$ is continuous and differentiable for all
 $x \in R$
35. The sum of x and y coordinates of all the points on
 the curve $y = x^2 + x + 1$ where tangent is equally
 inclined to the co-ordinate axes is
 (1) 1 (2) 2
 (3) 3 (4) 4
36. Let $\int e^x (3(\sin x - 3\cos x) + 4(3\cos^3 x - \sin^3 x)) dx$
 $= e^x f(x) + c$ then the range of $|f(x)|$ is
 (1) $\left[0, \frac{1}{2}\right]$ (2) $[0, \sqrt{2}]$
 (3) $[0, 1]$ (4) $[0, 2]$
37. The area bounded by $f(x) = \max\{x, \sin^{-1} x\}$ and
 x -axis in $[0, 1]$ is
 (1) $\frac{\pi}{2}$ (2) $\frac{\pi}{2} - 1$
 (3) $\frac{\pi}{2} + 1$ (4) $\frac{\pi}{2} + 2$
38. The solution of differential equation
 $\frac{dy}{dx} + (\sec x)(y - 1) + \tan x = 0$ is $y = (x + c)f(x)$,
 where 'c' is the arbitrary constant then the value of
 $f(0)$ is
 (1) 0 (2) 3
 (3) 1 (4) 2
39. Four students A, B, C, D apply for admission in four
 centres of Aakash Institute named C_1, C_2, C_3, C_4 .
 The probability that A, B, C, D never get the
 admission in C_1, C_2, C_3, C_4 respectively such that
 no two gets admission at the same centre and all
 gets admission, is p then the value of $(256 p)$ is
 (1) 9 (2) 8
 (3) 7 (4) 5
40. Let $\vec{a}, \vec{b}, \vec{c}$ are vectors having magnitudes 1, 1 and
 $\frac{\sqrt{13}}{2}$ respectively and $(\vec{a} \cdot \vec{b}) \vec{a} + \vec{b} = \vec{c}$ then the
 angle between \vec{a} and \vec{b} is
 (1) $\frac{\pi}{2}$ (2) $\frac{\pi}{4}$
 (3) $\frac{\pi}{3}$ (4) $\frac{\pi}{6}$





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MM : 120

**Sample Paper : Campus Recruitment Test
Mathematics (Engineering)**

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

- | | | | |
|---------|---------|---------|---------|
| 1. (1) | 11. (1) | 21. (1) | 31. (2) |
| 2. (4) | 12. (2) | 22. (2) | 32. (1) |
| 3. (1) | 13. (3) | 23. (1) | 33. (1) |
| 4. (2) | 14. (1) | 24. (4) | 34. (4) |
| 5. (2) | 15. (2) | 25. (3) | 35. (1) |
| 6. (4) | 16. (1) | 26. (4) | 36. (3) |
| 7. (3) | 17. (2) | 27. (1) | 37. (2) |
| 8. (2) | 18. (1) | 28. (3) | 38. (3) |
| 9. (3) | 19. (1) | 29. (2) | 39. (1) |
| 10. (3) | 20. (2) | 30. (4) | 40. (4) |



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- Rough work must not be done on the Answer sheet and do not use **white-fluid** or any other **rubbing material** on Answer sheet.
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Choose the correct answer :

- An arrow is shot into air. Its range is 200 m and its time of flight is 5 second. If $g = 10 \text{ m/s}^2$, then the horizontal component of velocity of the arrow is
 - 12.5 m/s
 - 25 m/s
 - 31.25 m/s
 - 40 m/s
- A stone weights $(10.0 \pm 0.1) \text{ kg}$ in air. The weight of the stone in water = $(5.0 \pm 0.1) \text{ kg}$. The maximum % error in the measurement of the specific gravity is
 - 5%
 - 6%
 - $\left(\frac{4}{3}\right)\%$
 - 2%
- Three masses are placed on the y -axis; 200 gm at $y = 0 \text{ cm}$, 500 gm at $y = 30 \text{ cm}$ and 400 gm at $y = 70 \text{ cm}$. The distance of the centre of mass from origin is nearly
 - 0.4 m
 - 0.5 m
 - 0.6 m
 - 0.7 m
- The escape velocity of a body at a height h above the surface of the earth is 36% of that from the surface of earth. If v_0 be the orbital velocity of this body near the surface of the earth, then what will be its orbital velocity at a height h ?
 - 36% of v_0
 - v_0
 - 36% of v_e
 - 18% of v_0
- A body begins to slide over the surface of another body when pulled with a force of 7 N. If we pull it with a force of 5 N, then the force of friction that will come into play should be
 - Zero
 - 0.5 N
 - 5 N
 - Data insufficient
- The lower end of a capillary tube of radius r is placed vertically in water. If h be the rise of water in capillary, then the heat evolved is
 - $\frac{\pi r^2 h^2 g}{2}$
 - $\pi^2 r^2 h^2 g$
 - $\frac{\pi r^2 h^2 g}{3}$
 - $\frac{\pi r^2 h^2 g}{4}$

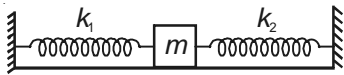
7. The gas in a vessel is subjected to a pressure of 20 atm at a temperature of 27°C. What is the pressure of the gas in the vessel after one half the mass of the gas is released from the vessel and the temperature of the remainder is raised by 50°C?

- (1) 11.7 atm (2) 17 atm
 (3) 8.5 atm (4) 10.8 atm

8. A bimetallic strip is heated through $t^\circ\text{C}$. If α_1 and α_2 be the linear co-efficients of expansion for the two metals, then the strip bends into an arc of radius R corresponding to inner strip. The thickness of each strip is d . The value of R is nearly

- (1) $\frac{dt}{\alpha_2 - \alpha_1}$ (2) $(\alpha_2 - \alpha_1)dt$
 (3) $\frac{d}{(\alpha_2 - \alpha_1)t}$ (4) $\frac{(\alpha_2 - \alpha_1).t}{d}$

9. A spring of constant k is cut into two parts having the ratio of their length 3:4 and now these parts having spring constants k_1 and k_2 are connected across a block of mass m . The time period of SHM of block will be



- (1) $2\pi\sqrt{\frac{12m}{49k}}$ (2) $2\pi\sqrt{\frac{7m}{12k}}$
 (3) $2\pi\sqrt{\frac{49m}{12k}}$ (4) $2\pi\sqrt{\frac{33m}{49k}}$

10. In Young's double slit experiment, the distance between 2 sources is 0.1 mm. The distance of the screen from source is 20 cm. Wavelength used is 5460 Å. The angular position of the first dark fringe is nearly

- (1) 0.08° (2) 0.16°
 (3) 0.20° (4) 0.32°

11. $\frac{7}{8}$ part of an artificial radioactive element decays in 168 second. The half-life of the element is

- (1) 2 second (2) 108 second
 (3) 56 second (4) 256 second

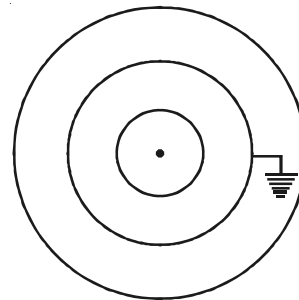
12. For a certain metal, ν (frequency of incident radiation) is twice ν_0 (threshold frequency) and electrons come out with a maximum velocity of 4×10^8 cm/sec. If the value of ν is $5\nu_0$, then the maximum velocity of photo electron will be

- (1) 2×10^8 cm/s (2) 8×10^8 cm/s
 (3) 20×10^8 cm/s (4) $\frac{4}{5} \times 10^8$ cm/s

13. The angle of minimum deviation for a prism of refractive index 1.5 is equal to the angle of prism. The angle of the prism is α . α is (given that $\cos 41^\circ = 0.75$)

- (1) 21° (2) 42°
 (3) 60° (4) 82°

14. There is a system of three concentric conducting shells having radii R ; $2R$ and $3R$ respectively. The innermost and outermost shells are given the charges Q and $-4Q$ respectively and middle one is grounded. The charge on the outer surface of middle shell will be

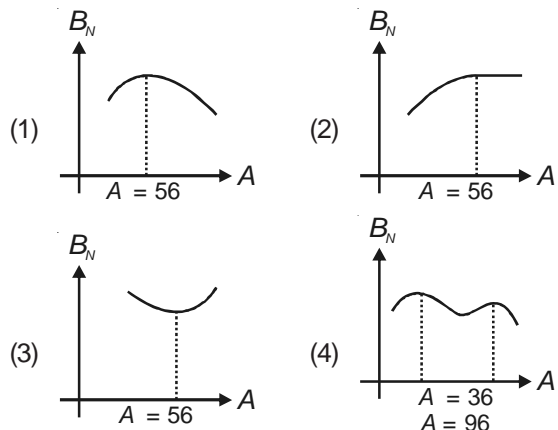


- (1) $\frac{2Q}{3}$ (2) $\frac{4Q}{3}$
 (3) $\frac{6Q}{3}$ (4) $\frac{8Q}{3}$

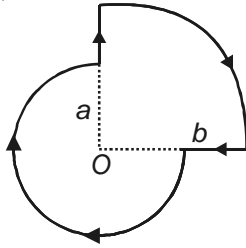
15. A resistor and an inductor are connected in series to a 220 V A.C. supply. When measured with A.C. voltmeter, the potential difference across the resistor is 132 volt, the potential difference across the terminals of the inductor is

- (1) 80 volt
 (2) $\sqrt{220 \times 132}$ volt
 (3) 176 volt
 (4) 358 volt

16. The dependence of binding energy per nucleon, B_N on the mass number A is approximately represented by

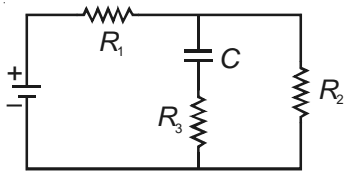


17. The magnetic field at the centre O is

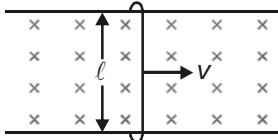


- (1) $\left(\frac{\mu_0 I}{2a} + \frac{\mu_0 I}{2b}\right) \otimes$ (2) $\left(\frac{3\mu_0 I}{8a} + \frac{\mu_0 I}{8b}\right) \otimes$
 (3) $\left(\frac{3\mu_0 I}{8a} - \frac{\mu_0 I}{8b}\right) \otimes$ (4) $\left(\frac{3\mu_0 I}{8a} + \frac{\mu_0 I}{4b}\right) \otimes$

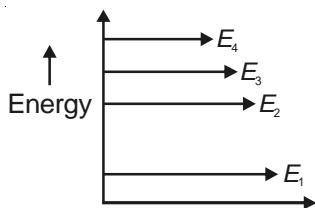
18. In the circuit shown in figure the steady state voltage across capacitor C is a fraction f of the battery emf. The fraction is decided by



- (1) R_1 only (2) R_1 & R_3 only
 (3) R_1 & R_2 only (4) R_1, R_2 & R_3
19. The figure shows a wire sliding on two parallel conducting rails placed at a separation ℓ . A magnetic field B exists in a direction perpendicular to plane of the rails. The force required to keep the wire moving at a constant velocity v is



- (1) $\ell^2 B$ (2) $\frac{\mu_0 B}{4\pi}$
 (3) $\frac{B\ell^2}{\mu_0 4\pi}$ (4) Zero
20. Figure represents, drawn to scale, the energy levels for an electron in a certain atom. The transition from E_3 to E_1 produces a green line. What transition could give rise to a red line?



- (1) E_2 to E_1 (2) E_4 to E_1
 (3) E_3 to E_1 (4) All of these

21. Induced electric field lines

- (1) Always make closed path
 (2) Do not make closed path
 (3) May make closed path
 (4) Are always straight

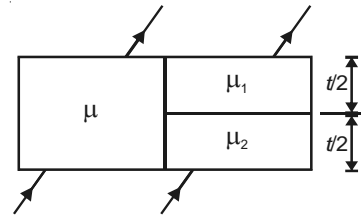
22. An electron is revolving round the nucleus in a circular orbit of radius R with speed V . The magnetic dipole moment of system is

- (1) $\frac{eVR}{2}$ (2) $\frac{\mu_0 eV}{4\pi R^3}$
 (3) Zero (4) eVR

23. Half life of polonium is 138 days. The last nucleus of this radioactive sample will decay in

- (1) 138 days (2) 2×138 days
 (3) 4×138 days (4) Unpredictable

24. In the following figure, a parallel beam emerges parallel. The relation between μ , μ_1 and μ_2 is



- (1) $\mu = \mu_1 + \mu_2$ (2) $\frac{1}{\mu} = \frac{1}{\mu_1} + \frac{1}{\mu_2}$
 (3) $\mu = \frac{\mu_1 + \mu_2}{2}$ (4) $\frac{2}{\mu} = \frac{1}{\mu_1} + \frac{1}{\mu_2}$

25. In YDSE, the angular position of point closest to central maxima intensity is $\frac{1}{4}$ th of the maxima intensity is

- (1) $\sin^{-1}\left(\frac{\lambda}{d}\right)$ (2) $\sin^{-1}\left(\frac{\lambda}{2d}\right)$
 (3) $\sin^{-1}\left(\frac{\lambda}{3d}\right)$ (4) $\sin^{-1}\left(\frac{\lambda}{4d}\right)$

26. Anode voltage is at +3 V. Incident radiation has frequency 1.4×10^{15} Hz and work function of the photo cathode is 2.8 eV. The minimum and maximum KE of photo electrons reaching the surface of anode is nearly

- (1) 3, 6 (in eV) (2) 0, 3 (in eV)
 (3) 0, 6 (in eV) (4) 2.8, 5.8 (in eV)

27. A charge q is uniformly distributed with in the volume of hollow sphere (insulated) of inner and outer radii r_1 and r_2 ($r_2 > r_1$). The electric field at a point P at a distance x from the centre is ($r_1 < x < r_2$)

(1) $\frac{qx}{4\pi\epsilon_0(r_2^3 - r_1^3)}$ (2) $\frac{q(x^3 - r_1^3)}{4\pi\epsilon_0(r_2^3 - r_1^3)}$

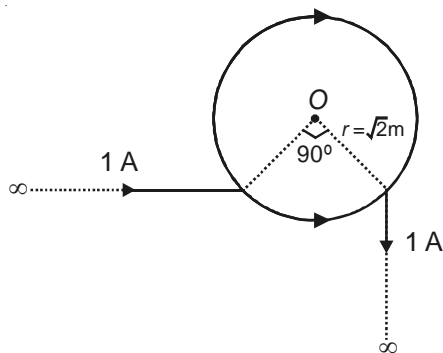
(3) $\frac{q(x^3 - r_1^3)}{4\pi\epsilon_0 x^2(r_2^3 - r_1^3)}$ (4) $\frac{qr_1^3}{4\pi\epsilon_0 x^2(r_2^3 - r_1^3)}$

28. A thin disc (or dielectric) having radius "a" and charge q distributed uniformly over the disc is rotated with "n" rotations per second about its axis. The magnetic field at the centre of disc is

(1) $\frac{\mu_0 qn}{a}$ (2) $\frac{\mu_0 qn}{2a}$

(3) $\frac{\mu_0 qn}{4a}$ (4) $\frac{3\mu_0 qn}{4a}$

29. In the figure shown, what will be the magnitude of magnetic field at the centre "O" of coil. Both the straight sections are infinitely long and wire is of uniform cross-section?



(1) $\frac{\mu_0}{2\pi} \left(2 + \frac{\pi}{\sqrt{2}} \right)$ (2) $\frac{\mu_0}{2\pi} \left(1 + \frac{\sqrt{3}\pi}{2} \right)$

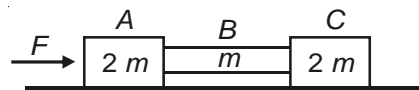
(3) $\frac{\mu_0}{2\pi} \left(3 + \frac{\pi}{\sqrt{2}} \right)$ (4) Zero

30. There are four objects ring, disc, hollow sphere and solid sphere of same mass and same radii and they are released from top of rough inclined surface from same position having same μ but friction is insufficient for their pure rolling (for all). Which object will have more rotational kinetic energy at bottom?

(1) Ring (2) Hollow sphere

(3) Solid sphere (4) Same for all

31. The system is pushed by a force F as shown. All surfaces are smooth except between B and C. Friction co-efficient between B and C is μ . Minimum value of F to prevent block B from slipping is



(1) $\frac{3mg}{2\mu}$ (2) $\frac{5mg}{2\mu}$

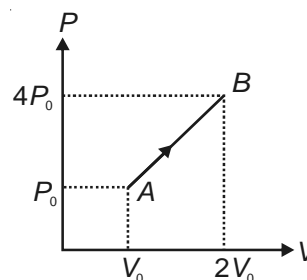
(3) $\frac{5}{2}\mu mg$ (4) $\frac{3}{2}\mu mg$

32. The force $F = Cy^2(\hat{j})$ with C as negative constant, is

(1) Conservative (2) Non-conservative

(3) Restoring (4) Dissipative

33. One mole of a diatomic gas is undergoing the process shown by P - V diagram. Molar specific heat of the gas for this process will be (R : gas constant)



(1) $\frac{13R}{4}$

(2) $3R$

(3) $\frac{20R}{7}$

(4) $\frac{25R}{7}$

34. There are 12 identical balls kept at equal separation between them. All the odd number balls move towards right and even number balls towards left with same speed. If all the collisions (head-on) are elastic in nature then the total number of possible collisions will be

(1) 10

(2) 15

(3) 21

(4) 24

35. A body of mass M is having potential energy $U(x) = U_0(1 - \cos dx)$, where U_0 and d are constant. The time period of small oscillations is

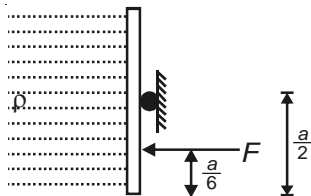
(1) $2\pi\sqrt{MU_0d^3}$

(2) $2\pi\sqrt{\frac{M}{U_0d^2}}$

(3) $2\pi\sqrt{\frac{U_0d^2}{M}}$

(4) $2\pi\sqrt{\frac{U_0}{Md^2}}$

36. A liquid having density ρ is filled over one side of a square shaped gate, having dimension " $a \times a$ " and it is hinged exactly in the middle. Now an external force " F " is applied at a height $\frac{a}{6}$ from the bottom to keep it in equilibrium. The magnitude of " F " should be



- (1) $\frac{\rho g a^3}{2}$ (2) $\frac{\rho g a^3}{4}$
 (3) $\frac{\rho g a^3}{6}$ (4) $\frac{\rho g a^3}{8}$
37. Two tuning forks when sounded together produce 6 beats per second. The first fork has the frequency 3% higher than a certain fixed frequency f_0 and the second has the frequency 2% less than the f_0 . The frequencies of the forks are
- (1) 126.3, 120.3 Hz
 (2) 162.7, 156.7 Hz
 (3) 136.2, 130.2 Hz
 (4) 123.6, 117.6 Hz

38. An Indian pitcher has 10 kg of water. Water cools by means of evaporation through pores. Find the time in which the temperature of water falls by 5°C is nearly (Rate of evaporation is 5 g/min)

$[C_{\text{water}} = 1 \text{ cal/g}^\circ\text{C}, L_{\text{water}} = 540 \text{ cal/g}]$

- (1) 20 min, 10 second
 (2) 18 min, 30 second
 (3) 14 min, 12 second
 (4) 10 min, 10 second
39. 3 moles of H_2 are mixed with 1 mole of Ne. The specific heat at constant pressure is

- (1) $\frac{9}{4}R$ (2) $\frac{13}{4}R$
 (3) $\frac{9}{2}R$ (4) $\frac{13}{2}R$

40. Anisotropic solid has linear expansion co-efficient as $\alpha_x, \alpha_y, \alpha_z$ for three regular axis. The co-efficient of cubical expansion is

- (1) $\alpha_x \alpha_y \alpha_z$ (2) $\frac{\alpha_x + \alpha_y + \alpha_z}{3}$
 (3) $\alpha_x + \alpha_y + \alpha_z$ (4) $\frac{\alpha_x \alpha_y}{\alpha_z}$





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Sample Paper : Campus Recruitment Test
Physics (Engineering)

Time : 1½ Hr.

Complete Syllabus of Class XI & XII

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|---------|---------|---------|---------|
| 1. (4) | 11. (3) | 21. (1) | 31. (2) |
| 2. (1) | 12. (2) | 22. (1) | 32. (1) |
| 3. (1) | 13. (4) | 23. (4) | 33. (3) |
| 4. (1) | 14. (4) | 24. (4) | 34. (3) |
| 5. (4) | 15. (3) | 25. (3) | 35. (2) |
| 6. (1) | 16. (1) | 26. (1) | 36. (2) |
| 7. (1) | 17. (2) | 27. (3) | 37. (4) |
| 8. (3) | 18. (3) | 28. (1) | 38. (2) |
| 9. (1) | 19. (4) | 29. (4) | 39. (2) |
| 10. (2) | 20. (1) | 30. (3) | 40. (3) |