# SKD Talent Search Exam

## CLASS - XII

## 2021

**INSTRUCTIONS**

**MAXIMUM MARKS : 160** **SET - 1** **TIME : 1:30 HR.**

- Use BLACK PEN ONLY to darken the appropriate circle.
- There are 40 questions carrying Four marks each. There shall be no -ve marking. Answer with no response will be awarded zero mark.
- Darken ONLY ONE CIRCLE for each question.
- Marks your answer in the circle corresponding to the Question being answered.
- Do not put any stray marks on the answer sheet.
- Do not erase any given answer by eraser.
- No Mobile phones are permitted inside the examination hall. Possession of mobile phones even in switched-off mode will be treated as use of unfair-means and will be dealt accordingly.
- Use of calculators, tablet, calculator watches, papers etc. are not permitted unless otherwise specified.

S.K.D. SINGH
Founder

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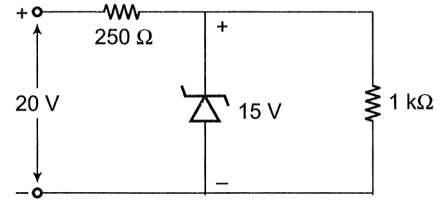
# PHYSICS

01. A metallic surface ejects electrons when exposed to green light of intensity I but not when exposed to yellow light of intensity I. It is possible to eject electrons from the same surface by
(i) yellow light of some intensity which is more than I
(ii) green light of any intensity
(iii) red light of any intensity
(iv) violet light of any intensity
(1) (i), (ii) (2) (ii), (iii)
(3) (i), (iv) (4) (ii), (iv)

02. The ionization potential of hydrogen atom is –13.6 eV. An electron in the ground state of a hydrogen atom absorbs a photon of energy 12.75 eV. How many different spectral lines can one expect when the electron make downward transition
(1) 1 (2) 4 (3) 2 (4) 6

03. 90% of the active nuclei present in a radioactive samlpe are found to remain undecayed after 1 day. The percentage of undecayed nuclei left after two days will be
(1) 85% (2) 81% (3) 80% (4) 79%

04. A zener diode, having breakdown voltage equal to 15 V, is used in a voltage regulator circuit shown in figure. The current through the diode is




(1) 20 mA (2) 5 mA (3) 10 mA (4) 15 mA

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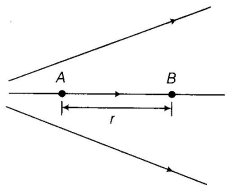
05. Figure shows the electric lines of force emerging from a charged body. If the electric field at A and B are $E_A$ and $E_B$ respectively and if the distance between A and B is r, then




(1) $E_A > E_B$ (2) $E_A < E_B$
(3) $E_A = \frac{E_B}{r}$ (4) $E_A = \frac{E_B}{r^2}$

06. The potential energy of a charged parallel plate capacitor is $U_0$. If a slab of dielectric constant K is inserted between the plates then the new potential energy will be (assuming charge is constant)
(1) $\frac{U_0}{k}$ (2) $U_0k^2$ (3) $\frac{U_0}{k^2}$ (4) $U_0^2$

07. A wire has resistance 12Ω. It is bent in the form of a circle. The effective resistance between the two points on any diameter is equal to
(1) 12Ω (2) 6Ω
(3) 3Ω (4) 24Ω

08. The force between two long parallel wires A and B carrying current is 0.004 $Nm^{-1}$. The conductors are 0.01 m apart. If the current in conductor A is twice that of conductor B, them the current in the conductor B would be
(1) 5 A (2) 50 A
(3) 10 A (4) 100 A

## ROUGH WORK

SKD Talent Search Exam

09. A coil having an area $A_0$ is placed in a magnetic field which changes from $B_0$ to $4B_0$ in time interval t. The emf induced in the coil will be
(1) $3A_0B_0/t$ (2) $4A_0B_0/t$
(3) $3B_0/A_0t$ (4) $4B_0/A_0t$

10. The instantaneous current in an AC circuit is $I = \sqrt{2}\sin(50t + \pi/4)$. The rms value of current is
(1) $\sqrt{2}$ A (2) 50 A
(3) 90 A (4) 1 A

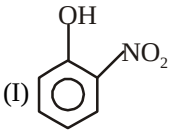
## CHEMISTRY

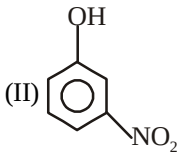
11. A mixture of gases contains $H_2$ and $O_2$ gas in the ratio of 1: 4 (w/w). What is the molar ratio of the two gases in the mixture?
(1) 4 : 1 (2) 16 : 1
(3) 1 : 1 (4) 1 : 4

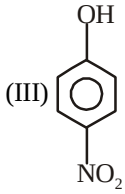
12. The number of electrons in d-subshell of $Cr^{2+}$(Z = 24) is not equal to:
(1) s-electrons in Ne(Z = 10)
(2) unpaired electrons in Fe(Z = 26)
(3) p-electrons in O(Z = 8)
(4) d-electrons in $Fe^{3+}$(Z = 26)

13. Ionic radii in Å of $N^{3-}$, $O^{2-}$ and $F^-$ are respectively:
(1) 1.71, 1.36, 1.40
(2) 1.36, 1.40, 1.71
(3) 1.36, 1.71. 1.40
(4) 1.71, 1.40, 1.36

14. Which of the following is the most volatile?

(I) 

(II) 

(III) 


(1) I (2) (II)
(3) III (4) All are equally volatile

15. The stability order of $O_2$ and its ions is:
(1) $O_2^{2+} > O_2^+ > O_2 > O_2^- > O_2^{2-}$
(2) $O_2^{2+} = O_2^{2-} > O_2^+ = O_2^- > O_2$
(3) $O_2^{2+} = O_2^+ > O_2^{2-} = O_2^- > O_2$
(4) $O_2^{2-} = O_2^- > O_2 = O_2^+ > O_2^{2+}$

16. The $K_{sp}$ of $Cr(OH)_3$ is $1.6 \times 10^{-30}$. The molar solubility of this compound in water is:
(1) $1.6 \times 10^{-30}/27$ (2) $\sqrt{1.6\times10^{-30}}$
(3) $\sqrt[4]{1.6\times10^{-30}}$ (4) $\sqrt[4]{1.6\times10^{-30}/27}$

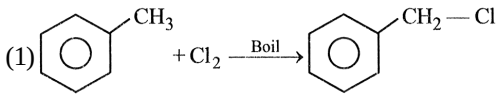
17. The increasing order of stability of the following free radicals is:
(1) $(CH_3)_2\dot{C}H < (CH_3)_3\dot{C} < (C_6H_5)_2\dot{C}H < (C_6H_5)_3\dot{C}$
(2) $(C_6H_5)_3\dot{C} < (C_6H_5)_2\dot{C}H < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$
(3) $(C_6H_5)_2\dot{C}H < (C_6H_5)_3\dot{C} < (CH_3)_3\dot{C} < (CH_3)_2\dot{C}H$
(4) $(CH3)_2\dot{C}H < (CH_3)_3\dot{C} < (C_6H_5)_3\dot{C} < (C_6H_5)_2\dot{C}H$

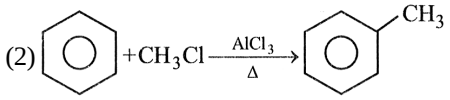
18. $CH_3-CH_2-C\equiv C-CH_3 \xrightarrow{1\%HgSO_4 \text{ in } 40\% H_2SO_4/\Delta} ?$
The main product is:
(1) $CH_3-CH_2-CH_2-CH_2-CHO$
(2) $CH_3-CH_2-\underset{\underset{O}{\|}}{C}-CH_2-CH_3$
(3) $CH_3-CH_2-CH_2-\underset{\underset{O}{\|}}{C}-CH_3$
(4) $CH_3-CH_2-CH=CH-CH_3$ (trans)

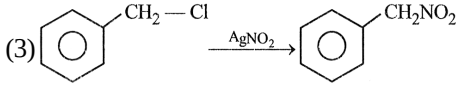
19. Which of the following will give red ppt on reacting with $R-C\equiv CH$?
(1) $AgNO_3/NH_3$
(2) $Cu_2Cl_2/NH_3$
(3) $Na/NH_3$
(4) All of these

**ROUGH WORK**

20. Which of the following is a free radical substitution reaction?

(1) 

(2) 

(3) 

(4) $CH_3CHO + HCN \rightarrow CH_3\underset{\underset{O}{\|}}{CH} - CN$

## Biology

21. Urethral meatus refers to the
(1) Urinogenital duct
(2) Opening of vas deferens into urethra
(3) External opening of the urinogenital duct
(4) Muscles surrounding the urinogenial duct

22. The genes causing cancer are:
(1) Structural genes (2) Expressor genes
(3) Oncogenes (4) Regulatory genes

23. Significance of 'heat shock' method in bacterial transformation is to facilitate:
(1) Binding of DNA to the cell wall
(2) Uptake of DNA through membrane transport proteins
(3) Uptake of DNA through transient pores in the bacterial cell wall
(4) Expression of antibiotic resistance gene

24. The site of production of ADA in the body is:
(1) Bone marrow (2) Lymphocytes
(3) Blood plasma (4) Monocytes

25. 'FSH' acts on
(1) Leydig cell (2) Sertoli cell
(3) Immunopotent cell (4) Androgen

26. For "Vasectomy" & "Tubectomy" the incorrect options are
(A) Irreversible
(B) Reversible
(C) Tempory method of sterilisation
(D) Permanent method of sterilisation
(1) A and D (2) A and C
(3) B and C (4) B and D

27. Disease caused by bacteria are
(1) Typhoid, tetanus, common cold
(2) Typhoid, Pneumonia, tetanus
(3) Typhoid, Scabies, tetanus
(4) Typhoid, Syphilis, tetanus

28. Capacity of Bioreactor is
(1) 10-100 Litres
(2) 100-1000 Litres
(3) 1000-5000 Liters
(4) 100-10,000 Liters

29. EcoRI here 'R' refers to
(1) Species
(2) Genus
(3) Strain
(4) Order of discovery

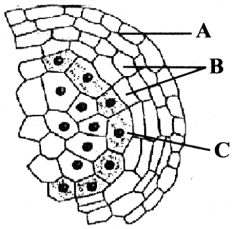
30. Match the column

| **Column-A** | **Column-B** |
|---|---|
| A. disease man has been fighting since many years | i. common cold |
| B. Most common human ailments | ii. Ring worm |
| C. Most infectious human disease | iii. Cancer |
| D. A dreadful disease | iv. Malaria |

(1) A-i, B-ii, C-iii, D-iv
(2) A-iv, B-i, C-iii, D-ii
(3) A-iv, B-i, C-ii, D-iii
(4) A-iv, B-iii, C-ii, D-i

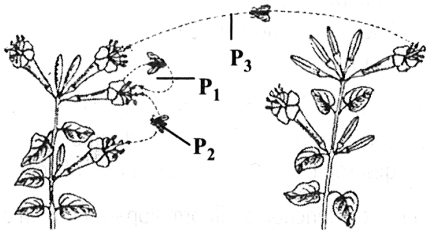
**ROUGH WORK**

31. The given diagram shows microsporangium of a mature anther. Identify A, B and C.



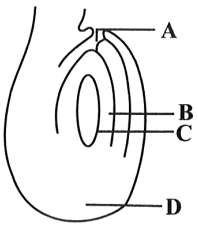

(1) A-Middle layer, B-Endothecium, C-Tapetum
(2) A-Endothecium, B-Tapetum, C-Middle layer
(3) A-Endothecium, B-Middle layer, C-Tapetum
(4) A-Tapetum, B-Middle layer, C-Endothecium

32. The given diagram shows two plants of the same species. Identify the types of pollination indicated at $P_1$, $P_2$ and $P_3$




(1) $P_1$-Allogamy, $P_2$-Chasmogamy, $P_3$-Cleistogamy
(2) $P_1$-Autogamy, $P_2$-Xenogamy, $P_3$-Geitonogamy
(3) $P_1$-Autogamy, $P_2$-Geitonogamy, $P_3$-Xenogamy
(4) $P_1$-Geitonogamy, $P_2$-Allogamy, $P_3$-Autogamy

33. Identify the parts labelled A, B, C and D in the given figure and select the correct option.

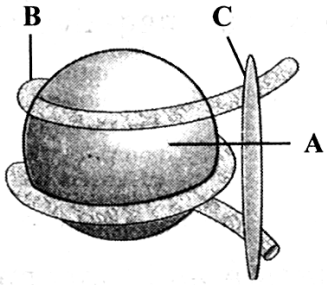



(1) A-Chalaza, B-Female gametophyte, C-Embryo sac, D-Micropyle
(2) A-Chalaza, B-Nucellus, C-Embryo sac, D-Micropyle
(3) A-Micropyle, B-Egg, C-Embryo sac, D- Chalaza
(4) A-Micropyle, B-Nucellus, C-Embryo sac, D-Chalaza

34. .....pairs of contrasting traits were studied by Mendel in pea plant
(1) 6 (2) 7
(3) 8 (4) 10

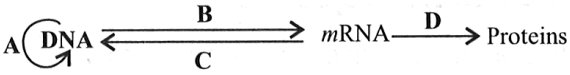
35. In *Antirrhinum* (dog flower), phenotypic ratio in $F_2$, generation for the inheritance of flower colour would be
(1) 3 : 1 (2) 1 : 2 : 1
(3) 1 : 1 (4) 2 : 1

36. Refer the given figure of nucleosome and select the option that correctly identifies the parts A, B and C




(1) A-DNA, B- Histone octamer, C-$H_1$ histone
(2) A-Histone octamer, B-$H_1$ histone, C-DNA
(3) A-Histone octamer, B-DNA, C-$H_1$ histone
(4) A-DNA, B- $H_1$ histone, C-Histone octamer

37. The given flowchart represents the flow of genetic information between biomolecules. Identify the processes A, B, C, and D and select the correct option




(1) A-Translation, B-Transcription, C-Replication, D-Reverse Transcription
(2) A-Replication, B-Transcription, C-Translation, D-Reverse Transcription
(3) A-Replication, B-Transcription, C-Reverse Transcriptionn, D-Translation
(4) A-Replication, B-Reverse Transcriptionn, C-Transcription, D-Translation

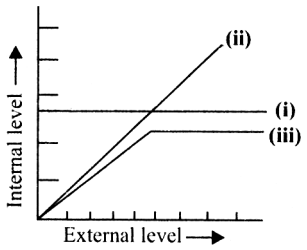
## ROUGH WORK

38. Match column-I with column-II and select the correct option from the codes given below

| **Column-I** | **Column-II** |
|---|---|
| A. F. Meischer | (i) DNA double helix |
| B. Griffith | (ii) Nuclein |
| C. Hershey and Chase | (iii) S.*pneumoniae* |
| D. Wilkins and Franklin | (iv) Bacteriophages |
| E. Wilkins and Franklin | (v) X-ray diffraction studies |

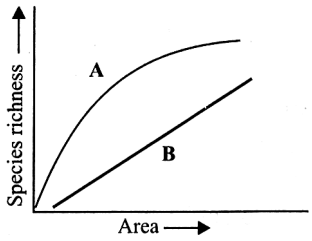
(1) A-ii, B-iii, C-iv, D-i, E-v
(2) A-v, B-iv, C-iii, D-i, E-ii
(3) A-i, B-iii, C-iv, D-ii, E-v
(4) A-i, B-iv, C-iii, D-ii, E-v

39. Given graph represents the response of organisms to various abiotic factors. On this basis, select the correct option for (i), (ii) and (iii)




(1) (i) - Conformers, (ii) - Regulators, (iii)-Partial regulators
(2) (i) - Regulators, (ii) -Partial regulators, (iii)-Conformers
(3) (i) - Partial regulators, (ii) -Regulators, (iii)-Conformers
(4) (i) - Regulators, (ii) -Conformers, (iii)-Partial regulators

40. Which option correctly describes the equations for curves A and B, in the given graph of species - area relationship?




(1) A- $S = CA^Z$, B - Log S = Log C + Z Log A
(2) A - Log S = Log C + Z Log A, B - $S = CA^Z$
(3) A - Log C = Log S + Z Log A, B - $S = CA^Z$
(4) A- $S = CA^Z$, B - Log C = Log S + Z Log A

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**ROUGH WORK**