## UNIVERSITY OF MYSORE Postgraduate Entrance Examination October - 2022



MAXIMUM MARKS : 50
MAXIMUM TIME : 75 MINUTES
(Including time for filling O.M.R. Answer sheet)

## INSTRUCTIONS TO THE CANDIDATES

1. The sealed question paper booklet containing 50 questions enclosed with O.M.R. Answer Sheet is given to you.
2. Verify whether the given question booklet is of the same subject which you have opted for examination.
3. Open the question paper seal carefully and take out the enclosed O.M.R. Answer Sheet outside the question booklet and fill up the general information in the O.M.R. Answer sheet. If you fail to fill up the details in the form as instructed, you will be personally responsible for consequences arising during evaluating your Answer Sheet.
4. During the examination:
a) Read each question carefully.
b) Determine the Most appropriate/correct answer from the four available choices given under each question.
c) Completely darken the relevant circle against the Question in the O.M.R. Answer Sheet. For example, in the question paper if "C" is correct answer for Question No.8, then darken against SI. No. 8 of O.M.R. Answer Sheet using Blue/Black Ball Point Pen as follows:

Question No. 8. (A) (B) (D) (Only example) (Use Ball Pen only)
5. Rough work should be done only on the blank space provided in the Question Booklet. Rough work should not be done on the O.M.R. Answer Sheet.
6. If more than one circle is darkened for a given question, such answer is treated as wrong and no mark will be given. See the example in the O.M.R. Sheet.
7. The candidate and the Room Supervisor should sign in the O.M.R. Sheet at the specified place.
8. Candidate should return the original O.M.R. Answer Sheet and the university copy to the Room Supervisor after the examination.
9. Candidate can carry the question booklet and the candidate copy of the O.M.R. Sheet.
10. The calculator, pager and mobile phone are not allowed inside the examination hall.
11. If a candidate is found committing malpractice, such a candidate shall not be considered for admission to the course and action against such candidate will be taken as per rules.
12. Candidates have to get qualified in the respective entrance examination by securing a minimum of 8 marks in case of SC/ST/Cat-I Candidates, 9 marks in case of OBC Candidates and 10 marks in case of other Candidates out of 50 marks.

## INSTRUCTIONS TO FILL UP THE O.M.R. SHEET

1. There is only one most appropriate/correct answer for each question.
2. For each question, only one circle must be darkened with BLUE or BLACK ball point pen only. Do not try to alter it.
3. Circle should be darkened completely so that the alphabet inside it is not visible.
4. Do not make any unnecessary marks on O.M.R. Sheet.
5. Mention the number of questions answered in the appropriate space provided in the O.M.R. sheet otherwise O.M.R. sheet will not be subjected for evaluation.

1) For the quantum numbers $\mathrm{n}=3,1=2$ and $\mathrm{m}=+1$, which orbital has this set of quantum numbers?
(A) $\mathrm{d}_{\mathrm{x}^{2}-\mathrm{y}^{2}}$
(B) $\mathrm{d}_{\mathrm{xz}}$
(C) $\mathrm{d}_{\mathrm{yz}}$
(D) $d_{z^{2}}$
2) Atomic number of Cu -atom is $29(\mathrm{Z}=29)$, the number of electrons with the azimuthal quantum numbers $1=1$ and $1=2$ respectively,
(A) 12 and 10
(B) 12 and 9
(C) 12 and 6
(D) 12 and 3
3) The correct order of first ionization potential in the following set is
(A) $\mathrm{K}>\mathrm{Na}>\mathrm{Li}$
(B) $\mathrm{B}>\mathrm{C}>\mathrm{N}$
(C) $\mathrm{Be}>\mathrm{Mg}>\mathrm{Ca}$
(D) $\mathrm{Ge}>\mathrm{Se}>\mathrm{C}$
4) Which of the following complexes are not correctly matched with the hybridization of their central metal ion?
(i) $\mathrm{Ni}(\mathrm{CO})_{4} ; \mathrm{sp}^{3}$
(ii) $\left[\mathrm{Ni}(\mathrm{CN})_{4}\right]^{2-} ; \mathrm{sp}^{3}$
(iii) $\left[\mathrm{CoF}_{6}\right]^{3-} ; \mathrm{d}^{2} \mathrm{sp}^{3}$
(iv) $\left[\mathrm{Fe}(\mathrm{CN})_{6}\right]^{3-} ; \mathrm{sp}^{3} \mathrm{~d}^{2}$

Select the correct option:
(A) (i) and (ii)
(B) (i) and (iii)
(C) (i), (ii) and (iv)
(D) (ii), (iii) and (iv)
5) Identify the type of process involved in the following chemical reaction:
$\mathrm{Al}_{2} \mathrm{O}_{3} \cdot 2 \mathrm{H}_{2} \mathrm{O} \longrightarrow \mathrm{Al}_{2} \mathrm{O}_{3}+2 \mathrm{H}_{2} \mathrm{O}$
(A) Roasting
(B) Calcination
(C) Smelting
(D) Reduction
6) What will be the effect of acidity by the addition of $\mathrm{KNH}_{2}$ in liquid ammonia?
(A) Increase
(B) Neutralize
(C) Decrease
(D) Both (A) and (B)
7) The number of $\alpha$ - and $\beta$ - particles emitted in the reaction :

(A) $8 \alpha, 6 \beta$
(B) $6 \alpha, 8 \beta$
(C) $8 \alpha, 10 \beta$
(D) $6 \alpha, 4 \beta$
8) $\mathrm{Ce}^{4+}$ is intensely coloured due to
(A) f-f transition
(B) d-d transition
(C) the charge transfer
(D) the presence of unpaired electrons
9) Cobalt(III) forms several octahedral complexes with ammonia. Which of the following will not give a test for chloride ions with $\mathrm{AgNO}_{3}$ ?
(A) $\mathrm{CoCl}_{3} \cdot 3 \mathrm{NH}_{3}$
(B) $\mathrm{CoCl}_{3} \cdot 4 \mathrm{NH}_{3}$
(C) $\mathrm{CoCl}_{3} \cdot 5 \mathrm{NH}_{3}$
(D) $\mathrm{CoCl}_{3} \cdot 6 \mathrm{NH}_{3}$
10) Based on MOT, Identify the correct statement about magnetic property and bond order with respect to $\mathrm{O}_{2}^{+}$.
(A) Paramagnetic and bond order is less than $\mathrm{O}_{2}$
(B) Paramagnetic and bond order is greater than $\mathrm{O}_{2}$
(C) Diamagnetic and bond order is less than $\mathrm{O}_{2}$
(D) Diamagnetic and bond order is greater than $\mathrm{O}_{2}$
11) Molecular structures of noble gas compounds of $\mathrm{XeO}_{3}$ and $\mathrm{XeOF}_{4}$ are respectively,
(A) Trigonal planar and square planar
(B) Pyramidal and trigonal bipyramidal
(C) Pyramidal and square pyramidal
(D) Trigonal planar and square pyramidal
12) The CFSE of $\mathrm{Co}(\mathrm{III})$ in $\left[\mathrm{CoF}_{6}\right]^{3-}$ is
(A) $-4 D q+P$
(B) $-6 D q+P$
(C) $-8 \mathrm{Dq}+\mathrm{P}$
(D) $-10 \mathrm{Dq}+\mathrm{P}$
13) The compounds $\left[\mathrm{Cr}\left(\mathrm{H}_{2} \mathrm{O}\right)_{6}\right] \mathrm{Cl}_{3}$ and $\left[\mathrm{Cr}\left(\mathrm{H}_{2} \mathrm{O}\right)_{4} \mathrm{Cl}_{2}\right] \mathrm{H}_{2} \mathrm{O}$ represent
(A) Ligand isomerism
(B) Linkage isomerism
(C) Hydrate isomerism
(D) Ionization isomerism
14) The median in the given data $3.080,3.094,3.107,3.056,3.112,3.174$ and 3.198 is...
(A) 3.056
(B) 3.198
(C) 3.094
(D) 3.107
15) Which of the following not containing polar bond?
(A) $\mathrm{CO}_{2}$
(B) $\mathrm{O}_{3}$
(C) $\mathrm{NCl}_{3}$
(D) $\mathrm{CH}_{4}$
16) Benzene and toluene are separated by
(A) Distillation
(B) Fractional distillation
(C) Distillation under reduced pressure
(D) Steam distillation
17) Octane 2,7-dione is obtained from the ozonolysis of
(A) 1,3-Dimethyl cyclohexene
(B) 1,5-Dimethyl cyclohexene
(C) 1,4-Dimethyl cyclohexene
(D) 1,2-Dimethyl cyclohexene
18) Reaction of benzyl chloride with hexamethylene tetramine in aqueous ethanol followed by acidification gives
(A) Benzylamine
(B) Benzyl alcohol
(C) Benzaldehyde
(D) Benzyl ethyl ether
19) Aromatic sulphonation is
(A) Reversible nucleophilic substitution
(B) Reverse electrophilic substitution
(C) Irreversible nucleophilic substitution
(D) Irreversible electrophilic substitution
20) Methyl magnesium iodide reacts with ethyl orthoformate gives
(A) acetaldehyde
(B) acetone
(C) trimethyl carbinol
(D) ethane
21) Phenyl acetate on heating with anhydrous Aluminium chloride followed by acidification to give
(A) Meta hydroxyl acetophenone
(B) Acetic acid
(C) Benzoic acid
(D) Ortho hydroxyl acetophenone
22) Cannizzaro's reaction involves an intermolecular transfer of
(A) ${ }^{+}$
(B) $\overline{\mathrm{H}}$
(C) $\mathrm{O}^{-} \mathrm{H}$
(D) $\dot{\mathrm{H}}$
23) Identify the product in the following reaction :

Glucose $\xrightarrow[\text { heat }]{\mathrm{Hl}, \text { red } \mathrm{P}}$ ?
(A) 1-iodo hexane
(B) 2-iodo hexane
(C) 3-iodo hexane
(D) n-hexane
24) Arrange the following in the increasing order of basicity
i) p-methoxy aniline
ii) Aniline
iii) $N, N$-dimethyl aniline
(A) ii $<$ i<iii
(B) $\mathrm{i}<\mathrm{ii}<\mathrm{iii}$
(C) $\quad$ ii<iii<i
(D) iii $<$ ii $<$ i
25) Name the R, S notations for the following:


(A) $\mathrm{R}, \mathrm{R}$
(B) $\mathrm{R}, \mathrm{S}$
(C) $\mathrm{S}, \mathrm{S}$
(D) $\mathrm{S}, \mathrm{R}$
26) Oxidation of citral with alkaline potassium permanganate followed by chromic acid gives.
(A) Acetone, glyoxal and pimelic acid
(B) Acetone, oxalic acid and laevulic acid
(C) Acetone, glyoxalic acid and pimaric acid
(D) Acetone, glyoxal and linolenic acid
27) Basicity of Pyrrole and Pyridine is
(A) Pyridine is more basic than Pyrrole
(B) Pyrrole is more basic than Pyridine
(C) Pyrrole and Pyridine have same basicity
(D) None of these
28) The two-ring system present in nicotine are
(A) Pyridine and Pyrrole
(B) Pyridine and Pyrrolidine
(C) Piperidine and Pyrrole
(D) Piperidine and Pyrrolidine
29) The IR stretching frequency of carbonyl group of acetophenone is
(A) $1600 \mathrm{~cm}-1$
(B) $1690 \mathrm{~cm}-1$
(C) $2830 \mathrm{~cm}-1$
(D) $3320 \mathrm{~cm}-1$
30) Neoprene is a
(A) Fibre
(B) Drug
(C) Plastic
(D) Rubber
31) The ionic strength $(\mu)$ for $0.05 \mathrm{M} \mathrm{K}_{2} \mathrm{SO}_{4}$ is...
(A) 0.5 M
(B) 0.15 M
(C) 0.2 M
(D) 0.6 M
32) Plants and living beings are the examples of,
(A) Isolated system
(B) Adiabatic system
(C) Open system
(D) Closed system
33) For a linear plot of $\log (x / m)$ versus $\log p$ in a Freundlich adsorption isotherm, the correct statement is ( k and n are constants).
(A) Both k and $1 / \mathrm{n}$ appear in the slope term
(B) $1 / \mathrm{n}$ appears as the intercept
(C) Only $1 / n$ appears as the slope
(D) $\log (1 / \mathrm{n})$ appears as the intercept
34) The Nernst distribution law is applied in the
(A) Haber's process for the manufacture of $\mathrm{NH}_{3}$
(B) Parke's process for the extraction of Ag
(C) Contact process for the manufacture of $\mathrm{H}_{2} \mathrm{SO}_{4}$
(D) Mond's process for the extraction of metal
35) Three aqueous solutions of $K C 1$ labelled as $X, Y$ and $Z$ with concentrations $0.2 \mathrm{M}, 0.02 \mathrm{M}$ and 0.002 M , respectively. The order of van't Hoffs factor for the solutions is
(A) ix $<$ iy $<$ iz
(B) ix $>$ iy $>$ iz
(C) $i x=i y=i z$
(D) ix $<$ iy $>$ iz
36) The hydrogen ion concentration of a solution with pH value 2.69 is..
(A) $2.042 \times 10^{-3} \mathrm{M}$
(B) $3.69 \times 10^{-2} \mathrm{M}$
(C) $4.31 \times 10^{-4} \mathrm{M}$
(D) 0.369 M
37) What is the concentration of $\mathrm{H}_{2} \mathrm{SO}_{4}$ when 10 mL of 0.2 M of $\mathrm{H}_{2} \mathrm{SO}_{4}$ is added to 90 mL of $\mathrm{H}_{2} \mathrm{O}$ ?
(A) 0.02 N
(B) 0.04 M
(C) 0.04 N
(D) 0.002 M
38) The increase in internal energy of the system is 100 J when 300 J heat is supplied to it. What is the amount of work done by the system?
(A) -200 J
(B) +200 J
(C) -300 J
(D) -400 J
39) The Miller indices of crystal planes which cut through crystal axes at (6a, 3b, 3c) is,
(A) $(2,3,1)$
(B) $(3,2,6)$
(C) $(1,3,2)$
(D) $(1,2,2)$
40) A molecule absorbs microwave photons of wave length 20 cm and causes rotation, the energy difference between the two rotational levels in joules is
(A) $3.3 \times 10^{-25}$
(B) $9.9 \times 10^{-25}$
(C) $5.9 \times 10^{-25}$
(D) $4.3 \times 10^{-25}$
41) The solubility ' $s$ ' of a sparingly soluble salt is related to its equivalent conductance at infinite dilution by the relation ( k in specific conductance)
(A) $s=\frac{k \times 1000}{\lambda_{\infty}-\lambda}$
(B) $s=\frac{c \times 1000}{\lambda_{\infty}-\lambda}$
(C) $s=\frac{k \times 1000}{\lambda_{\infty}}$
(D) $s=\frac{c \times 1000}{\lambda_{\infty}}$
42) The total number of normal modes of vibrations of $\mathrm{N}_{2} \mathrm{O}$ molecule will be
(A) 4
(B) 3
(C) 6
(D) 2
43) The alkali hydrolysis of an ester represented by,
$\mathrm{CH}_{3} \mathrm{COOC}_{2} \mathrm{H}_{5}+\mathrm{NaOH} \longrightarrow \mathrm{CH}_{3} \mathrm{COONa}+\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{OH}$, this reaction is,
(A) Second -order but not bimolecular
(B) Bimolecular but first-order
(C) Bimolecular but not second-order
(D) Bimolecular and second-order
44) The $t_{1 / 2}$ of a reaction is doubled as the initial concentration of the reactant is doubled, the order of the reaction is,
(A) Second-order
(B) Zero-order
(C) First-order
(D) Fractional-order
45) The primary reference electrode for the measurement of electrode potential is
(A) Glass electrode
(B) Normal calomel electrode
(C) Standard hydrogen electrode
(D) Silver-silver chloride electrode
46) Which of the following element is associated with ferroalloys?
(A) Copper
(B) Nickel
(C) Silicon
(D) Zinc
47) In the analysis of copper-nickel alloy, the nickel is determined gravimetrically using
(A) Diphenylamine
(B) Dithiooxamide
(C) 8-hydroxy quinoline
(D) Dimethylglyoxime
48) Which of the following is not used to detect manganese(II) ion in an analysis of inorganic mixture?
(A) Lead oxide
(B) Zinc oxide
(C) Potassium persulfate
(D) Sodium bismuthate
49) Iron (III) is treated with thiocyanate to give red colouration due to
(A) Reduction
(B) Oxidation
(C) Complexation
(D) Neutralization
50) Iron in the haematite ore is determined volumetrically using dichromate as an oxidant. An indicator used in this experiment is
(A) Diphenylamine
(B) Ferroin
(C) Phenolphthalein
(D) Neutral Red

## 荣 葉

## Rough Work

## అభ్యథిรగษిగి శ్జอఒసేగఆు



 ఎంబదన్ను யరిరిలలిసిరి.



 జదాబ్దారరంగిరుత్తిర.


 లుత్తరహస్ను నిధణరిి.


 కుంబిర:




 ळలళెయల్లిన లుదాळరణ నైలణి.
 యృడ్బొలు.
 పిల్టలిద్యానిలయుద
 ஹృఁగబळుదు.




 అంచగఆన్ను யֹడియత్ర్ప్దు.

## ఓ.ఎం.ఆరా. ळలఆయన్ను కుంబలు ష్యృజసెగళు









Note : English version of the instructions is printed on the front cover of this booklet.

