GATUNDU JOINT EVALUATION EXAMS 2018.

CHEMISTRY 233/3 MARKING SCHEME.

Q.1 Table 1

(I) Complete table………………………………………………………………………………………….(2marks)

   PENALTIES/CONDITIONS

  (i) Complete table with 11 readings…………………………………………………………(2marks)
  (ii) Complete table with 9-10 readings………………………………………………………($1\frac{1}{2}$ marks)
  (iii) Complete table with 6-8 readings………………………………………………………(1mark)
  (iv) Complete table with less than 6 readings……………………………………………(0mark)
  (v) Treat the initial temperature value (t =0) above $40^{°}$ C and below $10^{°}$ C as unrealistic values and penalize ……………………………………………………………………………………….(1mark)
  (vi) Penalize 1 mark if all values given in the table are constant.

(II) Use of decimals……………………………………………………………………………………….(1mark)

Accept whole numbers or reading to 1dp (.o or .5) or 2dp (.00 , .25 .50 ,.75) used consistently. Otherwise penalize FULLY (0mark)

(III) Accuracy……………………………………………………………………………………………….(1mark)

 Compare the candidates initial temperature reading i.e at t = 0 with school value,if within ± $2^{°}$C award ……(1mark).

If outside penalize FULLY……………………………………………………………………………….(0mark)

(IV) Trend ……………………………………………………………………………………………………(1mark)

Award $\frac{1}{2}$ mark for constant temperature from (0 - 1) minute and second $\frac{1}{2}$ mark for continuous rise then drop or constant.

(b) Δ T = highest temperature – lowest temperature $\frac{1}{2}$ mark

  = Ans $\frac{1}{2}$ mark

(c) $\frac{50×4.2×Δ⍰}{1000}$ (1mark) = Ans kJ (1mark)…………………………………………………………………..(2marks)

 Units may or may not be given but if given MUST be correct units.

CONDITIONS /PENALTIES

i. Formula may not be given but if given MUST be correct , otherwise **PENALIZE FULLY** for wrong formula.

ii. Penalize $\frac{1}{2}$ mark ONCE for wrong transfer of Ans in (c) above.

iii. Penalize $\frac{1}{2}$ mark ONCE for wrong transfer of ΔT.

iv. For strange values of ΔT and ans in (c) and (d) above **PENALIZE FULLY** (0mark)

v. Penalize $\frac{1}{2}$ mark if ans in Kj or J for arithmetic error outside ± 2 Joules and outside ± 2 units 3 dp if in Kj.

PROCEDURE II

Table 2…………………………………………………………(5marks)………………..Distributed as follows

A. Complete table …………………………………………………………………….(1mark)
CONDITIONS

    i. Complete table with 3 titrations done………………………..(1mark)

    ii. Incomplete table with 2 titrations done ……………………($\frac{1}{2}$ mark)

    iii. Incomplete table with only 1 titration done……………..(0mark)

    N/B penalize ($\frac{1}{2}$ mark) each to a MAXIMUM penalty of ($\frac{1}{2}$ mark) ie penalize ($\frac{1}{2}$ mark) ONCE.

B. Use of DECIMALS……………………………………………….1mark (tied to 1st and 2nd rows only)
CONDITIONS AND PENALTIES

    i. Accept 1or 2 dp used consistently.otherwise penalize FULLY (0mark)

    ii. If 2 dp are used the 2nd MUST be 0 or 5 otherwise penalize FULLY.

    iii. Accept inconsistency in the use of zeros as initial burette readings eg 0,0.0,0.00.

C. ACCURACY …………………………………………………………………………..1mark

Compare the candidateʼs correct titre values with the school value (sv) teacher correct average titre and award as follows.

    i. If at least one is within ±0.1 of sv award ……………………1mark.

    ii. If non is within ±0.1 of sv but at least is within ±0.2 of sv award ………………($\frac{1}{2}$ mark)

    iii. If no value is within ±0.2 of sv award …………………………………………………0mark

    N/B

If there was wrong arithmetic or no subtraction done in the table, compare **CORRECTLY WORKED OUT** value(s) with sv and award accordingly.

D. PRINCIPLES OF AVERAGING……………………………………………………………………….1mark

CONDITIONS

    i.   3 consistent titrations done are within ±0.2 and averaged………….1mark
    ii.   3 titrations done but **ONLY 2** are possible and averaged……………….1mark
    iii.   If only 2 titrations done are consistent and averaged…………………….1mark
    iv.   If 3 inconsistent titrations are done and averaged…………………………..0mark
    v.   2 titrations done are inconsistent and averaged………………………….….0mark
    vi.   3 consistent titrations done and **ONLY** 2 averaged…………………………0mark
    vii.   Only 1 titration done……………………………………………………………………0 mark

PENALTIES

    i.   Penalize $\frac{1}{2}$ mark for wrong arithmetic if error is outside 2 units in the 2nd decimal place.

    ii.   Penalize $\frac{1}{2}$ mark for no working shown even if the answer is correct.

    iii.   If correct answer is given from wrong working award …………………………0mark

eg

$\frac{20+20+20}{2}$ =20 ,   20+20+20 = $\frac{60}{3}$ = 20 , 20+20+20 = 20

N/B

    a)   Accept rounding off /truncation of answer to 2 dp eg 21.666 as 21.66 or 21.67 otherwise penalize $\frac{1}{2}$ mark for rounding off to 1 dp or a whole number.

    b)   Accept ans if it works out **EXACTLY** to 1dp or a whole number.

E. FINAL ACCURACY……………………………………………………………………….1mark(tied to correct average titre)

Compare the candidate, s correct average value with the sv and award as follows

    i.   If within ± 0.1 of sv award …………………………………………………………..(1mark)

ii. If not within ± 0.1 of sv but within ± 0.2 of sv ………………………………..($\frac{1}{2}$ mark)

iii. If not within ± 0.2 of sv award …………………………………………………….0mark

N/B

- If there are two possible correct average titre values from the candidate's use the one CLOSEST to the sv and credit accordingly.
- If WRONG principles of averaging is used by the candidate pick the correct values(if any) average and award accordingly.

CALCULATIONS

F. $\frac{0.5 \times \square\square\square\square\square}{1000}$ ($\frac{1}{2}$ mark) =   Ans $\frac{1}{2}$ mark

G. (i) $\frac{\square\square\square\ \square\square\ \square}{2}$ ($\frac{1}{2}$ mark) = Ans ($\frac{1}{2}$ mark)

(ii) $\frac{\square\square\square\ \square\square\ \square\ (\square) \times 100}{25}$ ($\frac{1}{2}$ mark) = Ans ($\frac{1}{2}$ mark)

(iii) Ans (D) + Ans G(ii) ……..($\frac{1}{2}$ mark) = Ans ($\frac{1}{2}$ mark)

(iv) $\frac{\square\square\square\ \square\square\ \square(\square\square\square) \times 1000}{50}$ ($\frac{1}{2}$ mark) = Ans ($\frac{1}{2}$ mark)

CONDITIONS /PENALTIES

i. If there is wrong transfer of titre in (F) , Ans in G(ii) , G(ii) and Ans (D) penalize($\frac{1}{2}$ mark) otherwise PENALIZE FULLY for strange figures.

ii. Number of moles should be given to at least 4 dp unless it works out exactly.

iii. Units may not be given but if given MUST be correct otherwise penalize $\frac{1}{2}$ mark for wrong units used.

Q.2   (a)

TEST 1	EXPECTED OBSERVATIONS
Take half a spatula of solid Q and put in a dry boiling tube, heat ($\frac{1}{2}$ mark) test for any gas produced using a wet red litmus paper. ($\frac{1}{2}$ mark)	White sublimate($\frac{1}{2}$ mark) on cooler parts/ Pungent smell ($\frac{1}{2}$ mark) A colourless gas that turns red litmus paper blue.($\frac{1}{2}$ mark)

(2marks)

TEST 2	EXPECTED OBSERVATIONS
Put the remaining solid in a test tube. Add distilled water($\frac{1}{2}$ mark).Add few drops of lead (II) nitrate $\frac{1}{2}$ mark then warm $\frac{1}{2}$ mark.	White ppt is formed $\frac{1}{2}$ mark which dissolve $\frac{1}{2}$ mark on warming to form a colourless solution $\frac{1}{2}$ mark .

(3marks)

(b) TEST 1

Observation	Inferences
Pungent smell $\frac{1}{2}$ mark / colourless gas that turns red litmus paper blue $\frac{1}{2}$ mark	NH_4^+ present (1mark)

(2marks)

TEST 2

Observations	Inferences

White ppt $\frac{1}{2}$ mark dissolves on warming $\frac{1}{2}$ mark.	Cl⁻ present (1mark)

(2marks)

Q.3

ations	ices
with a yellow smoky flame (1mark)	Either $\diagdown C = C \diagup$ OR $\diagup \diagdown$ - C α C – Present (1mark) t for $\frac{1}{2}$ mark -carbon double bond/ carbon –carbon triple bond present. C = C / C α C , Alkenes /Alkynes present.

(a)

(

(b)

I.

Observations	Inferences
Acidified KMnO$_4$ is decolourised/ turns from purple to colourless. (1mark) REJECT the solution turns colourless	$\diagdown C = C \diagup$ $- C \alpha C -$ (1mark) ROH present

II.

Observations	Inferences
Bromine water is decourised/yellow colour of bromine water turn colourless. (1mark) **REJECT** Brown colour for bromine water.	present $\diagdown C = C \diagup$ $- C \alpha C -$

III.

Observations	Inferences
Effervescence/bubbles of a colourless gas/fizzing. (1mark) **REJECT**: Fizzling/sizzling/hissing. Ignore mention of Na$_2$CO$_3$ dissolves.	– COOH present (1mark) Accept for $\frac{1}{2}$ mark H$^+$/H$_3$O$^+$ present.

Observations	Inferences
pH = 5 or 6 (1mark)	Weakly acidic (1mark)

IV.