Sem - IV CBSGS / KT
Maths & Stats
2014-15

QP Code : **03193**

(3 Hours) [**Total Marks : 70**

N. B. : (1) **All** questions are **compulsory.**
(2) Use of simple **calculator** is allowed.
(3) Figures to **right** indicate **maximum** marks.

1. (a) Attempt any **seven** :– 14

(i) If mode= 68, median= 80, then the approximate value of Mean is:
(a) 68 (b) 86 (c) 75 (d) 78

(ii) The quartile deviation for the given data 100, 124, 141, 151, 121, 135, 116, 160, 157,142,158,103,100,107,110 is
(a) 22 (b) 44 (c) 107 (d) 151

(iii) Arithmetic mean of lower and upper quartile is 50. The upper quartile is 70 then the lower quartile Is:
(a) 10 (b) 20 (c) 30 (d) 40

(iv) If the mean and the coefficient of variation are 10 and 5 respectively. Then the standard deviation is:
(a) 10 (b) 50 (c) 0.5 (d) 5

(v) If Mean and SD are 20 and 4 respectively. If each item is increased by 2 then the Median and SD will be:
(a) 18,4 (b) 20,4 (c) 22,4 (d) 22,6

(vi) Two cards are selected at random from a well shuffled pack of cards. Then the probability that one is heart and the other is a spade,is:
(a) 13/102 (b) 26/102 (c) 169/2704 (d) none of these

(vii) If the probability of a defective bulb is 0.25, the mean and Variance of the distribution of defective bulbs in a total of 100 is:
(a) 25,10 (b) 100, 18.25 (c) 200, 18.75 (d) 25, 18.75

(viii) For a binomial distribution mean =4 and variance = 2.4 then the values of parameters n and p is:
(a) 10 and 0.04 (b) 10 and 0.4 (c) 5 and 0.4 (d) 5 and 0.2

(ix) The mean of a sample of 400 items taken from a large population is 10 with Standard deviation 2.3. Then the upper limit of 95% confidence for population mean is:
(a) 10.325 (b) 10.525 (c) 10.225 (d) 10.625

[TURN OVER

(b) Attempt any **one** :– 1

(x) To test the hypothesis of equality among several variables the best measure is:
(a) Z-test (b) t-test (c) Chi-square test (d) ANOVA

(xi) In hypothesis test 'Type-11' error means:
(a) Reject H_0 when H_0 is true (b) Reject H_0 when H_0 is false
(c) Accept H_0 when H_0 is true (d) Accept H_0 when H_0 is false

2. (a) Attempt any **two** (4 marks each) 8

(i) Calculate mean deviation from mode for the following data.

X:	5	10	15	20	25	30
F:	2	7	12	10	5	4

(ii) The following are the marks of three students A, B, C in 4 subjects P, Q, R and S respectively. The weights of the subjects are given. Decide which of the three students is the best?

Student	p	Q	R	s
Marks of A	28	30	40	20
Marks of B	35	25	20	15
Marks of C	30	35	30	20
Weight	4	3	2	1

(iii) Calculate Quartile Deviation from the following data:

Marks:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No of students:	5	8	9	13	30	20	10	05

(b) Attempt any **one** (3 marks) 3

(i) The mean weight of 150 students in a certain class is 60 kg. The mean weight of boys in the class is 70 kg and that of girls is 55 kg. Find the number of boys and girls in the class.

(ii) Mean salary of employees in a firm is Rs. 88.40. Find the missing frequency of the following distribution.

Class:	40-60	60-80	80-100	100-120	120-140
Freq:	6	12	17	–	5

[TURN OVER

3. (a) Attempt any **two** (4 marks each) 8

(i) The mean and the standard deviation of a sample size 25 were 12 and 3. If one more item 15 was added to this group, find the mean and standard deviation of all 11 items.

(ii) Find Mean Deviation about Median and it's coefficient for the following data:

Marks	5	6	7	8	9	10
Number of students:	7	13	18	8	3	1

(iii) The mean and the variance of a set of 100 values are 50 and 9 respectively. The mean and the variance of another set of 150 values are 45 and 5 respectively. Find the mean and the standard deviation of the combined set of 250 values.

(b) Attempt any **one** (3 marks each) 3

(i) Discuss any three merits of arithmetic mean over median and mode.

(ii) For a cricket player A, average run =53 and the S.D. of the runs = 40. For another player B, average run = 45 and the S.D. of the runs = 16. Verify who is more consistent?

4. (a) Attempt any **two** (4 marks each) 8

(i) From the frequency distribution find the moments about mean:

X:	2	3	4	5	6
F:	1	3	7	3	1

(ii) The four raw moments of a frequency distribution are 2, 20, 40 and 200 respectively. Comment on the nature of skewness and kurtosis.

(iii) Find Karl Pearson's coefficient of skewness for the following data:

Class:	3.5	4.5	5.5	6.5	7.5	8.5
Freq:	5	9	15	17	10	4

(b) Attempt any **one** (3 marks each) 3

(i) Find k and hence find the expected value of a random variable x and variance for the probability distribution:

X :	0	1	2	3	4	5
P(x):	0.15	0.20	0.10	k	0.30	0.20

(ii) A problem that can solve by A is 4/5 and the problem that can solve by B is 5/7. Find the probability that both will be solved.

[TURN OVER

5. (a) Attempt any **two** (4 marks each) 8

(i) The probability that any person 65 years old will be dead within a year is 0.05. Find the probability that out of group of 7 such persons (i) Exactly one will die (ii) No one will die (iii) At least one will die

(ii) A car hire from two cars, which it hires out day by day. The number of demands for a car on each day is distributed as poisson variate with mean 1.5. Calculate probability that on a day (i) neither car is used (ii) demand is more than 2 [given $e^{-1.5} = 0.2231$]

(iii) The mean height of 1000 students in a certain college is 165 cm and S.D is 10 em. Assuming this as a normal distribution, find the number of students whose height is greater than 172 em. Given for a standard normal variate z, the area between z =0 and z=0.7 is 0.25804.

5. (b) Attempt any **one** (3 marks) 3

(i) Fit a straight line for the following data:

X:	8.8	11.6	14.4	17.2	20
Y:	1	2	3	4	5

(ii) Fit an exponential curve $y = a\,b^x$, from the following data:

Year	:	2000	2001	2002	2003	2004
Income(in lakhs)	:	16	27	33	45	52

6. (a) Attempt any **two** (4 marks each) 8

(i) The average capacity by a capsule can cure a special disease is 0.144 units with a standard deviation of 0.052 units. The researcher has taken a random sample of 121 capsules of some batches and determined that they have a capacity of 0.151. Can the researcher conclude that the sample average capacity is more than the industry average at 10% significance level? [Given that at 10% significance level table value of t is 1.28)

(ii) In a random sample of 600 tablets manufactured by machine 57 are found to be defective. Manager of the company claims that tablet machine produced only 30% defective tablets. Can we say that manager's claim is supported by sample at 5% level of significance? Table value at 5% l.o.s is 1.96.

(iii) In order to determine if there are significant differences in durability of 3 makes of computers, frequency of repairs in the first year of purchase in 3 samples of each make are observed as follows: [Use 5% l.o.s]

Makes of computers		
A	B	c
5	8	7
6	10	3
8	11	5
9	12	4
7	4	1

Is there a significant difference in the durability? Use ANOVA technique, given that F0.05(2,12) = 3.89.

(b) Attempt any **one** (3 marks) 3

(i) Time taken by workers in performing a job by two different methods is given below:

Method I : 20 16 26 27 23 22

Method li: 27 33 42 35 32 34 38

Does data show that variances if time distribution from the population from which these samples are drawn is not significantly different? [Given $F_{0.05}(6,5) = 4.95$)

(ii) The table gives number of accidents occurred. Test whether the accidents are uniformly distributed over the week at 5% los (Chi-square value at 5 df = 11.07)

day	Mon	Tue	Wed	Thu	Fri	Sat
No. of accidents	14	18	12	11	15	14

Sem-IV CBSGS/KT
Ph. Colony 2014-15

QP Code : **02088**

(3 Hours) [**Total Marks : 70**

N. B. : (1) All questions are compulsory.
(2) Figures to right indicate full marks.

1. (a) Answer the following :- 12
   (i) Weakly acidic drugs are majorly absorbed in stomach. Justify.
   (ii) Define therapeutic index. Give its significance.
   (iii) NM blockers are skeletal muscle relaxants. Justify.
   (iv) Classify cholinergic receptors. Give an example of selective agonist and antagonist of each subtype of receptor.
   (v) Explain mechanism of action of reserpine.
   (vi) Describe synthesis of adrenaline in a flow diagram.
   (b) (i) Define - Drug intolerance. 3
   (ii) Which is the most potent class of diuretics.
   (iii) Define - Placebo.

2. (a) Answer any **two** of the following :- 8
   (i) Discuss salient features of oral route of drug administration. Add a note on advantages and disadvantages of it.
   (ii) Write a note on Phase-I metabolism reactions.
   (iii) Discuss the various consequences of plasma protein binding on distribution and elimination of drugs.
   (b) Write short noes on any **one** of the following :- 3
   (i) Drug induced carcinogenicity.
   (ii) Teratogenicity.

3. (a) Answer any **two** of the following :- 8
   (i) Describe enzyme linked receptors.
   (ii) Comment on dose response relationship.
   (iii) Explain the adenylylcyclase *c*-AMP pathway of G-protein coupled receptors.
   (b) Answer any **one** of the following :- 3
   (i) Explain mechanism of action of anticholinesterases. Add a note on their uses.
   (ii) Give therapeutic classification of adrenergic drugs.

4. (a) Answer any **two** of the following :- 8
   (i) Describe pharmacological actions and adverse effects of atropine.
   (ii) Describe the pharmacology of prazosin.
   (iii) Classify beta blockers. Add a note on cardio selective beta blockers.

(b) Answer any **one** of the following :- 3

(i) Explain mechanism of action of guanethedine.

(ii) Describe uses of anticholinergics.

5. (a) Answer any **two** of the following :- 8

(i) Classify antihypertensives. Discuss role of calcium channel blockers in management of hypertension.

(ii) Classify anti-anginals. Add a note on nitrates.

(iii) Explain mechanism of action of digitalis glycosides. Add a note on action of digitalis on a failing heart.

(b) Answer any **one** of the following :- 3

(i) Comment on thiazides as antihypertensives.

(ii) Explain mechanism of action of statins. State their adverse effects.

6. (a) Answer any **two** of the following :- 8

(i) Classify diuretics. Add a note on mechanism of action of spironolactone and its uses.

(ii) Describe pharmacology of furosemide.

(iii) Classify adrenergic receptors. Give their location, effects and examples of selective agonists and antagonists.

(b) Answer any **one** of the following :- 3

(i) Comment on disease induced changes in drug action.

(ii) Explain with example how genetic factors can influence drug action.

Sem- IV eBSGS/KT

Ph-Centics-II

2014-15

QP Code : 02086

(3 Hours) [Total Marks : 70

N.B. : (1) All questions are **compulsory.**
(2) Draw neat sketches wherever required.
(3) Figures to the right indicate **full marks.**

1. Answer the following :-
   (a) Disperse systems are thermodynamically unstable. Comment 3
   (b) State the functions of skin. 2
   (c) Describe features of ideal suppository base. 3
   (d) What are the characteristics of blood donor? 2
   (e) Enlist various quality control tests for catgut and discuss any one. 3
   (f) What are advantages and disadvantages of suspension on dosage form? 2

2. (a) Give an account of large scale manufacturing of emulsions. 4

   OR

   (a) Elaborate on quality control tests for suspensions.
   (b) Describe specifications for suppository bases. 4
   (c) Write a note on silk as sutures. 3

3. (a) Explain the phenomenon of Ostwald ripening in suspension. 4
   (b) Outline the principle of fractionation of plasma by solvent precipitation. 4

   OR

   (b) Write a note on Red Cell Concentrate.
   (c) Describe liquifaction test for suppositories. 3

4. (a) Discuss various raw materials used in formulation of creams. 4
   (b) Mention various theories of emulsion stabilization and elaborate on any one. 4
   (c) Outline the steps involved in production of clinical grade dextran. 3

   OR

   (c) Write a note on HETA starch as plasma substitute.

5. (a) Elaborate on precipitation method for preparation of suspension. 4
   (b) Vegetable oil cannot be substituted by liquid paraffin in Non-staining Iodine ointment, B.P.C. Comment. 3
   (c) What are the polymorphic changes that occur in theobroma oil? Give the measures to overcome it. 4

   OR

   (c) Write a note on packaging of suppositories.

6. (a) Explain hardening step in the manufacture of sutures. 3
   (b) Discuss the factors affecting stability of emulsion. 4

   OR

   (b) Use of mixed emulsifier confers greater stability to a emulsion. Comment
   (c) Describe in-vitro methods for evaluation of skin penetration. 4

Sem -IV CBSGS/KT

① e-II 2014-15

QP Code : **02084**

(3 Hours) [Total Marks : 70

N. B. : (1) All questions are **compulsory.**

1. (a) Answer the following :–
   (i) Arrange naphthalene, anthracene and phenanthrene based on reactivity and explain 1
   (ii) Draw the energy profile diagram for η-butane and discuss the stability of conformers. 2
   (iii) Give an example of Bucherer reaction. 1
   (b) Give the identification test for the following :– 3
   (i) An aromatic primary amine
   (ii) an anilide
   (iii) an alcohol
   (c) (i) Account for the basicity of isomeric anisidines 1
   $Kb_{(p)}$ 20×10^{-10}, $Kb_{(0)}$ 3×10^{-10}, $Kb_{(m)}$ 2×10^{-10}
   (ii) Account for the acidity of isomeric chlorobenzoic acids 1
   $Ka_{(o)}$ 120×10^{-5}, $Ka_{(m)}$ 15×10^{-5}, $Ka_{(p)}$ 10.3×10^{-5}
   (d) Write the products formed in the following and complete the reactions. 6

   (i) p-nitrobenzaldehyde $\xrightarrow{\text{StrongNaOH}}$
   (ii) α-bromocyclobutanone $\xrightarrow{\text{ag.NaOH}}$
   (iii) cyclopentanoneoxime $\xrightarrow{\text{H+, Δ}}$
   (iv) $CH_3CH_2\overset{\overset{O}{\|}}{C}-O^{18}C_2H_5 \xrightarrow[H_2O]{OH^-}$
   (v) Ethyl p-chlorobenzoate $\xrightarrow[H^+,\ \Delta]{n-\text{butanol(excess)}}$
   (vi) n-butanol + Pyridinium Chlorochromate →

2. (a) Complete the reactions and write the mechanism involved (any **two**) :– 4
   (i) $2\ C_6H_5CHO \xrightarrow[\text{aq.alc.},\Delta]{KCN}$
   (ii) $2-CH_3CH_2\overset{\overset{O}{\|}}{C}CH_3 \xrightarrow[\text{ii) }\Delta,-H_2O]{\text{i) aq.NaOH}}$
   (iii) p-nitrobenzaldehyde + alphabromoethylacetate $\xrightarrow{Zn;\text{ether}} \xrightarrow[\Delta]{H^+,}$

(b) Write the conversions (any **two**) :– 4
(i) Propanoic acid to N-methylpropanamide
(ii) p-bromotoluene to p-toluic acid
(iii) o-methylbenzonitrile to o-toluic acid
(iv) Acetophenone to benzoic acid

(c) Write the products formed when phenol is treated with 3
(i) bromine water and explain the reactions involved
(ii) dilute HNO_3

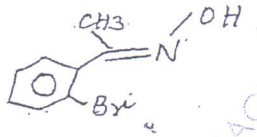
3. (a) Complete the reactions and write the mechanism involved (any **two**) :– 4

(i) p- Chloroaniline $\xrightarrow{HNO_2}$ $\xrightarrow{CuBr}$

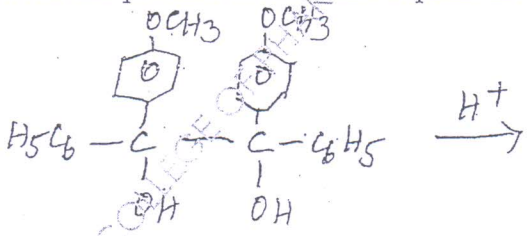
(ii) Propiophenone $\xrightarrow{HCO_2NH_4,\Delta}$ $\xrightarrow{H_3O^+}$

(iii) Benzyltrimethylammonium Chloride $\xrightarrow[\Delta]{NaNH_2}$

(b) Answer any **two** of the following :– 4
(i) Write the mechanism involved in the conversion of benzamide to aniline and explain the effect of substituents on benzamide on reactivity.
(ii) Benzoyl chloride and ethylbenzoate individually react with ethylamine and give same product. Write the product formed and explain.
(iii) Write the product formed when the following is treated with PCl_5 and explain.



(c) (i) Write the product formed and explain the mechanism in the reaction 2



(ii) Arrange HX in the order of reactivity with ROH and explain. 1

4. (a) (i) Write the products formed and complete the reaction 2

$$\text{Toluene (A)} + \text{Succinic anhydride} \xrightarrow{AlCl_3} \text{(B)} \xrightarrow{Zn(Hg),HCl} \text{(C)} \xrightarrow{HF} \text{(D)}$$

(ii) Complete the reaction and account for the products formed. 2

$$\text{Naphthalene (A)} \xrightarrow[40^0C]{H_2SO_4} \text{(B)} \xrightarrow{160^0C} \text{(C)}$$

(b) (i) Trans 1, 2-disubstituted cyclohexane is more stable than the cis isomer. Account for this by taking examples and also comment on optical activity of isomers. 2

(ii) Discuss the stability of conformations of 1, 3- disubstituted cyclohexanes. 1

(c) With mechanism answer the following (any **two**) :– 4

(i) Alkaline hydrolysis of ester

(ii) Reaction of ethyladipate with sodiumethoxide in alcohol.

(iii) Reaction of p-nitrobenzoic acid with thionyl Chloride and then with methylamine.

5. (a) Write the products formed and complete the reactions 4

(i) Phthalicanhydride (A) $\xrightarrow[\Delta]{NH_3}$ (B) $\xrightarrow[(ii)BrCH_2CO_2C_2H_5]{(i)KOH}$ (C) $\xrightarrow{N_2H_4}$ D + E

(ii) Benzene (A) $\xrightarrow[H_2SO_4\ \Delta]{\text{Fuming } HNO_3}$ (B) $\xrightarrow{Na_2S_2}$ (C)

(b) Write the conversions (any **two**) :– 4

(i) p-Chlorobenzoyl Chloride to p-chloroacetophenone

(ii) Methyl magnesium bromide to dimethylphenylmethanol

(iii) 4-methyl benzaldehyde to 4-methylcinnamic acid

(iv) Benzene to m-nitrobenzophenone.

(c) (i) Explain Williamson synthesis with a suitable example and discuss its advantage 2

(ii) Write the products formed when n-propylmethylether reacts with HI. 1

6. (a) Explain Curtius reaction and show how different products can be obtained from the same intermediate. 3

(b) Write the product of reaction of naphthalene with 3

(i) O_2, V_2O_5

(ii) $Na + C_2H_5OH$

(iii) $CrO_3 + Ac\ OH$

(c) Write the product formed when cinnamaldehyde is reacted with 2

(i) 9-BBN

(ii) Rancy Ni + H_2

(d) Convert Phenol to (i) Salicylaldehyde 3

(ii) o- hydroxyacetophenone and briefly explain.

Sem -IV CBSGS / KT
EP.A-I]
2014 - 15

QP Code : 02083

(3Hrs) Total Marks: 70

Q.1. i. Give Meanings- (03)

a) Titration error

b) Complexones

c) Common ion effect

ii. Give two differences and examples for each of the following- (04)

a) Primary standard and secondary standard
b) Oxidising agents and reducing agents

iii.- Explain in brief- (04)

c) Faradays first law of electrolysis.
d) Electrogravimetry

iv. a) A partition coefficient of a solute between water and ether is 4. If 15ml of an aqueous solution of the compound is extracted with 20ml of ether, what percentage of the original solute will be found in ether layer and in aqueous layer after equilibrium? (02)

b) Complete and Write the net balanced reactions: (02)

1) $IO_3^- + I^- \rightleftharpoons I_2$

2) $MnO^{4-} + H_2O_2 \rightleftharpoons Mn^{+2} + O_2$

Q.2. A) Explain types of non-aqueous solvents with suitable examples. (03)

B) Give principle , reactions , indicator used in following determination – (04)

I. Assay of NaCl

II. Standardisation of Silver Nitrate

C) Write short notes on- (04)

I. Standardisation of KFR

II. Amperometry

Q.3. A) Discuss differences between Iodimetry and Iodometry. (03)

B) Give therapeutic category, uses and assay of – (04)

i. Aspirin

ii. Calcium gluconate injection

C) Explain principle, construction and working of DME. (04)

Q. 4. A) Explain in brief cerrimetry and permagnometry? (03)

B)Explain theories of neutralisation indicators. (04)

C) What is gravimetry? Enlist unit operations in gravimetry. Add a note on precipitation from homogeneous solutions. (04)

Q. 5. A) Define precision. Calculate median and RSD for following data.

Replicate Burette readings obtained in standardisation of 0.05 M $KMnO_4$ solution (in mL)	28.5	28.7	28.3	28.2	27.9	28.5

B) Write short notes on-(**Any Two**) (04)

i. E. D. T. A. Back- titrations

ii. Masking and demasking agents

iii. Metallochromic indicators

C) Enlist factors affecting liquid-liquid extraction. Add a note on batch and multiple extractions. (04)

Q. 6. A) What is gravimetric factor? Calculate gravimetric factor for each of following: (03)

Sr. No.	Substance sought	Substance weighed
i.	Ba	$BaSO_4$
ii.	Al	$Al\text{-}(C_9H_6ON)_3$
Atomic weights: C:12, H:1, O:16, N:14, Ba: 137.33 , S:32		

B) Solve- (04)

i. Calculate the pH of the solution in which $[H^+] = 4 \times 10^{-5}$ mol/L

ii. Find the hydrogen ion concentration corresponding to pH=5.643

C) Answer the following. **(Any Two)** - (04)

i. Explain principle of oxygen flask combustion method

ii. A 16mg of API containing nitrogen was subjected to Kjeldahl analysis. Before the ammonia was steam distilled, 18ml of 0.020 M HCl was placed in the receiver. After distillation, 8.4ml of 0.020 N NaOH was required to back titrate the excess acid. Calculate the percentage of nitrogen present in the sample.

iii. Write short note on- nitrite titrations

Sem IV CBSGS
Microbiology

2014-15

QP Code : **02081**

(3 Hours) [Total Marks : 70

N.B. : (1) **All questions** are compulsory.
(2) Draw a neat labeled diagrams wherever necessary.

1. Answer the following:
   (a) Give the applications of Microbiology in pharmaceutical Industry. 1
   (b) Define Numerical aperture and give it's significance. 2
   (c) How to identify bacteria on the basis of cultural characteristics. 2
   (d) Name the causative agent for Tetanus. 1
   (e) How to diagnose the Shigella dysentry 1
   (f) Name two viruses containing RNA as genetic material 2
   (g) Name two fungal infections with the causative agents. 2
   (h) Define sanitization and Decimal reduction time. 2
   (i) Name the biological Indicator for Dry heat sterilization 1
   (j) Name two sterility testing media. 1

2. (a) Distinguish between procaryotes and Eucaryotes. 2
   (b) Define Pure culture and enlist different methods for Isolation of pure culture. 3
   (c) Write a note on lysogeny in λ Bacteriophage. 3
   (d) Write in brief about gaseous Shrilization. 3

3. (a) Explain in detail Dark field Microscopy and its applications. 4
   (b) Explain in detail Reproduction and Growth phases of Bacteria. 4
   (c) Explain fractional sterilization. 3

   OR

   (c) Explain Desiccation.

4. (a) Explain - Biological and Economic importance of algae. 2
   (b) Define selective media with example 2
   (c) Write a note on cultivation of anacrobic bacteria 3
   (d) Describe in detail Dry heat Sterilization. 4

5. (a) Differentiate between Gram +ve and Gram -ve bacterial Cell wall 4

   OR

   (a) Write a note on bacterial flagella
   (b) Describe any **one** 3
      (i) Rickettsial infection
      (ii) Chlamydial infection
   (c) Explain - cultivation and reproduction in fungi. 4

6. (a) Explain the principle of spore staining. 2
   (b) Write a note on Malarial parasite life cycle. 3
   (c) Explain phenol coefficient technique. 3
   (d) Distinguish between 3
      (i) Electron Microscopy and light Microscopy
      (ii) Bacteria and fungi.