

**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.-English**  
**PAPER : P-102**

Time: 3 Hours  
Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[8 x 2

1. **Answer any EIGHT of the following.**

- a) Why were the pilgrims going to Canterbury?
- b) How many members of the middle class were there in the Canterbury Tales?
- c) Where has Satan been hiding for the last seven days?
- d) What is Adam and Eve's tragic catastrophe?
- e) In 'Tintern Abbey' how do we know what season of the year it is?
- f) What is the importance of Hampton Court in the 'Rape of the Lock'.
- g) Describe the decoration on a Grecian urn in Keat's 'Ode on a Grecian Urn'.
- h) What message does Shelly want to convey in 'Ode to the West Wind'?
- i) Is Shelly's West Wind in reality a destroyer or a preserver?
- j) Which supernatural presence other than Geraldine indicate in the poem 'Christabel'?

*P.T.O.*

**Group - B**

[16x 4

2. What vision of England does the group of pilgrims in the Prologue suggest?

OR

What is the analysis of 'The General Prologue' in the Canterbury Tales?

3. In Paradise Lost, how is Milton successful in justifying the ways of God to man?

OR

What was the attitude of Adam towards Eve at the end of the Book IX of Paradise Lost.

4. Give an account about eighteenth century fashionable society in 'The Rape of the Lock'.

OR

In what way is 'The Rape of Lock' by Alexander Pope a satire in epic form.

5. In 'Tintern Abbey' what was Wordsworth's attitude towards nature when he first visited the Wye.

OR

Discuss supernaturalism in Coleridge's Christabel.

OR

How does John Keats focus on human relations in his 'Ode on Grecian Urn'?



**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019**

**Sub: PSYCHOLOGY**

Full Marks: 60

**Paper: 102**

Time: 4 Hours

*Answer the questions as per instruction.*

*The figure in the right hand margin indicate marks.*

*Question No. 1 is mandatory.*

**GROUP-A**

[2x6]

**1. Answer any SIX questions given below.**

- (a) Growth and development
- (b) Proximo distall development
- (c) Consciousness
- (d) Independent variable
- (e) Child abuse
- (f) Puberty
- (g) Secondary sex characteristics
- (h) Mention two stressors during adulthood.

**GROUP-B**

[12x4]

**Answer any FOUR questions.**

- 2. What is development? Discuss its nature and types.
- 3. Explain the use of experimental method in the study of life span development.
- 4. Describe the social and emotional development during childhood.
- 5. Narrate different stages of moral development as depicted by Kohlberg.
- 6. "Adolscence is a period of crisis - justify.

[2]

7. Discuss the physical and cognitive changes that occur during adulthood.
8. What is aging? Elucidate different theories of aging.

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**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019  
(COMMERCE)**

**Sub.- MCO  
PAPER : 102**

Time: 4 Hours  
Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[8 x 2

1. Answer any EIGHT of the following.

- a) What is meant by regression?
- b) In a Binomical Distribution,  $n = 100$ ,  $p = 0.4$ .  
Find mean and variance.
- c) What do you mean by non-sampling errors?
- d) Give the meaning of point estimation.
- e) Comment about Kurtosis of a normal distribution.
- f) What is meant by interpolation?
- g) What is a decision tree?
- h) State the Baye's theorem.
- i) What do you mean by sampling distribution?

**Group - B**

[16 x 4

Answer Any FOUR questions.

2. Given that  $r_{xy} = 0.4$ ,  $r_{xz} = 0.45$ ,  $r_{yz} = 0.25$
- a) Find  $r_{xy.z}$
  - b) Find  $R_{x.yz}$

3. Let  $X$  follows a Binomial Distribution with  $n = 25$  and  $p = 0.6$ . Find the exact probabilities of the following:
- $11 \leq X \leq 18$
  - $11 < X < 18$
4. a) For two events  $A$  and  $B$ , the following probabilities are given.  
 $P(A) = 0.5, P(B) = 0.25, P(A/B) = 0.8$   
 Find  $P(AB)$  and  $P(A \cup B)$ .
- b) Prove the addition theorem of probability.
5. Give an account of the types of Decision Making Environments.
6. Distinguish between probability and non-probability sampling. Elucidate their types.
7. Suppose you are to test  $H_0 : \mu \leq 20$  versus  $H_1 : \mu > 20$  using a sample size 100. (Given that  $Z_{.05} = 1.645$ ). If the sample gives  $\bar{x} = 21$  and  $S = 4$ , What does the test conclude? Draw a diagram to present your conclusion.
8. Write notes on :
- Interval estimation
  - Uses of F-test.



**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019**

Sub: STATISTICS

Full Marks: 60

Paper: 102

Time: 4 Hours

*Answer the questions as per instruction.**The figure in the right hand margin indicate marks.**Question No. 1 is mandatory.***1. Answer any SIX questions given below.** [2x6]

- (a) What is the use of probable error?
- (b) The regression equations are  $x+2y=5$ . and  $2x+3y-8=0$  and  $v(x)=12$ . Find the value of  $v(y)$ .
- (c) The correlation coefficient between X and Y was found to be 0.65. What would be the value of correlation between  $3x$  and  $-y$ .
- (d) What is partial correlation? Give an example.
- (e) What do you mean by snow ball sampling? Give an example.
- (f) Range of F test is \_\_\_\_\_ to \_\_\_\_\_ and range of Chi-square is \_\_\_\_\_ to \_\_\_\_\_.
- (g) What do you mean by Phi-coefficient?
- (h) It is possible to get the following from a set of experimental data, if  $r_{12}=0.8$ ,  $r_{31}=-0.5$ ,  $r_{12}=0.6$ .

**Answer any FOUR questions.**

2. (a) If X and Y are standardized normal variate and  $r_{uv}=(1+2ab) / 1^2+b^2$  where  $u= ax+br$ ,  $v = bx+ar$ , find  $rx$ . [6]
- (b) If X and Y are independent variates and  $u = x+y$ ,  $v = x-y$  then show that  $r_{uv}=r^2xu - r^2yu$ . [6]

3. Describe in detail the concept of correlation ratio with the help of correlation table showing bivariate distribution of two variables X and Y. [12]

4. (a) If all the correlation coefficients of zero order in a set of p-variates are equal to 'r'; show that every partial correlation coefficients of 5th order is  $r/1+rs$ . [6]

(b) The coefficient of multiple correlation R of a variate with the other (p-1) variate is given by [6]

$$1 - R^2 = (1 - r) \left[ \frac{1 + (p - 1)r}{1 + (p - 2)r} \right]$$

5. (a) If X has an F distribution with  $n_1$  and  $n_2$  d.f. Find distribution of  $1/x$  and give one use of this result. [6]

(b) Show that the probability curve of the distribution F is positively skewed. [6]

6. (a)  $(A) = \alpha = (B) = (\beta) = N/2$  show that  $(AB) = (\alpha \beta)$  and  $(A\beta) = (\alpha \beta)$  [6]

(b) Prove that  $\theta = 2Y/1+Y^2$ , where  $\theta$  is the coefficient of association and Y is the coefficient of colligation. [6]

7. Write short notes on (any three) [4x3]

(a) Chisquare test and its uses.

(b) Random sampling

(c) Multiple regression

(d) Intraclass correlation



**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.-HISTORY**  
**PAPER : 102**

Time: 4 Hours  
Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[2 x 8

1. **Answer any EIGHT of the following.**

- a) Who was the first president of USA and in which year America became independent?
- b) Which French emperor used to say "After me the deluge" and to which dynasty he belonged.
- c) In which year the city of Constantinople fell to the hands of the Muslim and who were the invaders?
- d) What do you mean by concordat and between whom this agreement was made?
- e) Who presided over the Congress of Vienna and in which year this Congress met?
- f) Who became the ruler of France after July Revolution and to which dynasty did he belong?
- g) Which war completed the unification of Germany and in which year this war was fought?
- h) Which Italian leader was associated with the Red Shirt Army? Where was he born?

[2]

- i) Which English Prime Minister introduced the Reform Act of 1832 and who brought forward this bill in the House of commons?
- j) Who wrote the book Das Kapital?
- k) In which Empire sun did never set?
- l) Which German political party promoted imperialist ideology?

**Group - B**

[16x 4

**Answer Any FOUR questions.**

- 2. Describe the causes of Reformation Movement in Europe.
- 3. Discuss about the Socio political causes of the French Revolution.
- 4. Give an account of the reforms of Napoleon as the first consul of France.
- 5. Describe the achievements and failures of the Congress of Vienna.
- 6. Evaluate the role of Cavour on the Italian unification movement.
- 7. Enumerate the causes responsible for the Industrial Revolution in England.
- 8. Describe how German imperialism was responsible for the outbreak of the second world war.



PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019

Sub: ODIA

Full Marks: 80

Paper: 102

Time: 4 Hours

*Answer the questions as per instruction.**The figure in the right hand margin indicate marks.**Question No. 1 is mandatory.*

୧. ତଳେ ଦିଆଯାଇଥିବା ପ୍ରଶ୍ନ ମାନଙ୍କ ମଧ୍ୟରୁ ଯେକୌଣସି ୮ ଗୋଟି ପ୍ରଶ୍ନର [2x8]

ଉତ୍ତର ଦିଅ ।

(କ) ଓଡ଼ିଆ ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟ ଗୁଡ଼ିକ କେଉଁ ଭାଷାର କାବ୍ୟ ପରମ୍ପରା ଦ୍ୱାରା ପ୍ରଭାବିତ ହୋଇଥିଲା ?

(ଖ) ସଂସ୍କୃତ ସାହିତ୍ୟରେ ରାତିବାଦର ପ୍ରବଳତା କିଏ ?

(ଗ) ପ୍ରଥମ ଓଡ଼ିଆ କାବ୍ୟର ନାମ କଣ ?

(ଘ) ଓଡ଼ିଆ କାବ୍ୟ ନିକ କାବ୍ୟ ଗୁଡ଼ିକ କେଉଁ ପରମ୍ପରା ଦ୍ୱାରା ପ୍ରଭାବିତ ?

(ଙ) ଉପେନ୍ଦ୍ର ଭଞ୍ଜଙ୍କ ଧରଣୀ ଯୌରାଣିକ କାବ୍ୟର ନାମ ଲେଖ ।

(ଚ) “ଏଥିକି ପ୍ରୀତି ଛାତିରେ କାତି ମାରିବା ଭଲ ଯେ”- ଏହା କେଉଁ କବିଙ୍କ ରଚନା ? କେଉଁ କାବ୍ୟରୁ ଆସିଅଛି ?

(ଛ) ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟର ରଚନା ରାତିକୁ ନେଇ ଓଡ଼ିଆରେ ରଚିତ ହୋଇଥିବା ଗୋଟିଏ କାବ୍ୟ ଓ ଏହାର କବିଙ୍କ ନାମ ଲେଖ ।

(ଜ) ‘କଷ୍ଟଲତା’ କାହାର ରଚନା ? ଏହାର କଥାବସ୍ତୁ କଣ ?

(ଝ) ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟର ସହୃଦୟ କିଏ ?

(ଞ) ଚଉତିଶାରେ ମୋଟ କେତେ ଅକ୍ଷରକୁ ନେଇ କବିତା ରଚନା କରାଯାଇଥାଏ ?

(ଟ) ଗୀତାଭିଧାନ- ଏକ କି ପ୍ରକାରର ଗ୍ରନ୍ଥ ?

(ଦୀର୍ଘଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ)

[16x4]

୨. ଓଡ଼ିଆ ମଧ୍ୟଯୁଗ କାବ୍ୟ ପରମ୍ପରାର ସାହିତ୍ୟିକ ଓ ସାଂସ୍କୃତିକ ପୃଷ୍ଠଭୂମି ସମ୍ପର୍କରେ ଆଲୋଚନା କର ।

(P.T.O...)

ଅଥବା

ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟ ପରମ୍ପରାରେ ରଚିତ କାବ୍ୟ ଗୁଡ଼ିକୁ ତୁମେ ରୀତିକାବ୍ୟ କହିବ, କିମ୍ବା ଆଲଂକାରିକ କାବ୍ୟ କହିବ ଯୁକ୍ତି ପୂର୍ଣ୍ଣ ଭାବେ ଉପସ୍ଥାପନ କର ।

୩. ପୁରାଣ ଆଶ୍ରିତ ଓଡ଼ିଆ କାବ୍ୟମାନଙ୍କର ଏକ ବିସ୍ତୃତ ବିବରଣୀ ପ୍ରସ୍ତୁତ କର ।

ଅଥବା

କବିସମ୍ରାଟ ଉପେନ୍ଦ୍ରଙ୍କ ରଚିତ କାଳ୍ପନିକ କାବ୍ୟ ଗୁଡ଼ିକର ତର୍ଜମା କର ।

୪. ମଧ୍ୟଯୁଗୀୟ ଓଡ଼ିଆ କାବ୍ୟ ମାନଙ୍କ ମଧ୍ୟରୁ କୌଣସି ଗୋଟିଏ ନିର୍ଦ୍ଦିଷ୍ଟ କାବ୍ୟକୁ ଦୃଷ୍ଟାନ୍ତ ସ୍ୱରୂପ ନେଇ ଏହାର ଆର୍ଜିକ ରଚନାର ବିଶେଷତ୍ୱ ବିଚାର କର ।

ଅଥବା

“କୁଟିଳଳ ବର୍ଷାବଳିରେ ଅଭୁତ । କବି ହୃଦ ଅବଲମ୍ବକୁ ଜାତ ।  
କୋବିଦମାନ ଘନାଘନ ବିନ୍ଦୁ । କେବେ ହେଁ ନଦିଶିଳ ଇନ୍ଦ୍ରଧନୁ ।  
କର ସୁବିଚାର । କବିତ୍ୱ ଶାନ୍ତିଜଳ ଏକାକାର ।” ପ୍ରୋକ୍ତ ଉଦ୍ଧୃତି ଆଧାରରେ ମଧ୍ୟଯୁଗୀୟ କାବ୍ୟର ଆତ୍ମିକ ବିଭବର ଆକଳନ କର ।

୫. ସବୁ କବି ଭୀମଭୋଇ ରଚିତ ଚଉତିଶା ଗୁଡ଼ିକର ଭାବ ସୌନ୍ଦର୍ଯ୍ୟ ବିଚାର କର ।

ଅଥବା

କବି ସାଲବେଗ କିମ୍ବା କବି ବନମାଳୀଙ୍କ ରଚିତ ଭଜନ ଓ ଜଣାଣ ଗୁଡ଼ିକରେ ପ୍ରଦର୍ଶିତ ବିମଳ ଭକ୍ତି ଭାବର ଆକଳନ କର ।

**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.- EDUCATION**

Time: 4 Hours

**PAPER : 102**

Full Marks: 60

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[6 x 2

1. **Answer any SIX of the following.**

- a) What is Secular Education?
- b) Distinguish between community and society.
- c) What is culture?
- d) What is modernisation?
- e) What is multilingualism?
- f) What is population education?
- g) What is equalisation of educational opportunity?
- h) How is peer group helpful in the education of students.

[2 ]

## **Group - B**

**Answer Any FOUR questions.**

2. Describe the meaning and nature of educational sociology. [2+10]
3. Describe how culture and politics play a crucial role in the education of students. [6+6]
4. Give your vision of school education for a new social order. [12]
5. Describe how is the school a subsystem of the social system. [12]
6. Describe the problem and issues in the education of Scheduled Caste and Scheduled Tribe students. [6+6]
7. Describe the causes and consequences of the population growth in India. [6+6]



**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.- Macro Economics**

Time: 4 Hours

**PAPER : 102**

Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[8 x 2

1. **Answer any EIGHT of the following.**

- a) Explain in brief the circular flow in a two sector economy.
- b) Write two things that GDP measures.
- c) What is social accounting?
- d) If inflation rate is 8% and real interest rate is 10%, what is the nominal rate of interest.
- e)  $C=100+0.8y$ ,  $I = 50$ . Find equilibrium level of income and saving.
- f) What is marginal efficiency of capital?
- g) What is average propensity to save?
- h) What is ratchet effect?
- i) What is liquidity preference theory of money?
- j) What are the determinants of money supply?

**Group - B**

[16 x 4

**Answer Any FOUR questions.**

2. "Real measure of national income is NNP and not GDP". Do you agree with the statement? Give arguments in support of your view point.
3. Write a note on consumption function while explaining the marginal and average propensity to consume.
4. Differentiate between the following
  - a) Gross and Net investment
  - b) Autonomous and induced investment.
5. Explain RBI approach to money supply in detail. What measures are taken to control money supply?
6. How is behaviouristic model different from the mechanistic model of money supply? Explain.
7. Explain Keynes psychological law of consumption. What are its assumptions.
8. What are various determinants of investment? Explain elaborately various short run and long run factors affecting marginal efficiency of capitals.





**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.- HINDI  
PAPER : 102**

Time: 4 Hours  
Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**GROUP- A**

[2x8]

1. निम्नलिखित किन्हीं आठ प्रश्नों के संक्षिप्त उत्तर दीजिए।
  - क) विद्यापति को 'मैथिली कोकिल' क्यों कहा जाता है?
  - ख) विद्यापति रचित 'चरित काव्यों' का नाम लिखिए।
  - ग) कबीर दास को 'निर्गुण ज्ञानमार्गी' धारा का कवि क्यों माना जाता है?
  - घ) 'यह तन जालों मसि करूँ.....' कबीर के इस दोहे का क्या तात्पर्य है?
  - ङ) 'पद्मावत्' महाकाव्य में नायक एवं नायिकाएँ किस किस के प्रतीक हैं?
  - च) सुफी कवियों की काव्य शैली को क्या कहा जाता है?
  - छ) सुरदास ने 'भ्रमरगीत' में किस मतवाद का समर्थन किया है?
  - ज) 'भ्रमरगीत' में उद्भव गोपिकाओं के सामने क्या प्रस्ताव रखते हैं?
  - झ) 'राम चरित मानस' के कुल कितने काण्ड हैं?
  - ञ) 'अयोध्या कांड' का सबसे मार्मिक प्रसंग क्या है? ?

## GROUP - B

( निम्नलिखित किन्हीं चार प्रश्नों के उत्तर दीजिए)

[16x4]

2. 'वसंत खंड' के आधार पर विद्यापति के प्रकृति-वर्णन की विशेषताओं की चर्चा कीजिए।

अथवा

'विद्यापति शृंगार-कवि हैं अथवा भक्त-कवि? तर्क सहित प्रमाणित कीजिए।

3. कबीर दास के रहस्यवाद की विशेषताओं का विवेचन कीजिए।

अथवा

'सिंहल द्वीप खंड' एवं 'नख-शिख खंड' में काव्य-सौंदर्य की विशेषताओं की चर्चा कीजिए।

4. 'भ्रमर गीत' में गोपिकाओं के तर्क का सारांश अपने शब्दों में लिखिए।

अथवा

'अयोध्या कांड' के काव्यगत विशेषताओं की चर्चा कीजिए।

5. किन्हीं दो पर टिप्पणियाँ लिखिए

- क) कबीर दास का मायावाद
- ख) जायसी की प्रेम-दृष्टि
- ग) 'भ्रमर गीत' का काव्य-कौशल
- घ) तुलसी दास की भक्तिभावना



**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.-ZOOLOGY**

Time: 4 Hours

**PAPER : P-102**

Full Marks: 60

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[6 x 2

1. **Answer any SIX of the following.**

- a) What are modified Mendelian dihybrid ratios?
- b) What is pleiotropy?
- c) What is sex influenced inheritance?
- d) What is the difference between complete linkage and incomplete linkage?
- e) What is LOD score?
- f) What is Hardy-Weinberg law?
- g) What is the significance of mitotic recombination?
- h) What is test cross?

**Group - B**

[12x 4

**Answer Any FOUR questions.**

2. Discuss the difference between dominant epistasis and recessive epistasis giving suitable examples.
3. Give an account of molecular mechanism of sex determination in *Drosophila*.
4. Describe different approaches of making genetic map in prokaryotes and eukaryotes.
5. Discuss types and importance of numerical alterations in chromosomes in eukaryotes.
6. Give an account of derivation of Hardy-Weinberg's law and factors influencing this law.
7. Describe different models of homologous recombination of genes. Discuss its effect on outcome of allele distribution in eukaryotes.
8. Give a brief account of maternal effects and cytoplasmic inheritance in living organisms.



**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019****Sub: MATHEMATICS**

Full Marks: 60

**Paper: 102**

Time: 4 Hours

*Answer the questions as per instruction.**The figure in the right hand margin indicate marks.**Question No. 1 is mandatory.***1. Answer any SIX questions given below.** [2x6]

- (a) State Riemann condition of integrability of a function  $f(x)$  in  $[a, b]$ .
- (b) Write down the properties of integration.
- (c) Define the term uniform convergence with respect to sequence.
- (d) Give the relation between continuity, differentiability and integrability.
- (e) Define Lebesgue measurable sets in  $\mathbb{R}^n$ .
- (f) Distinguish between outer measure and Lebesgue measure.
- (g) Define Banach space.
- (h) State Minkowski's inequality.

**Answer any FOUR questions.**

- 2. (a) State and prove Riemann-Stieltjes condition of integrability. [6]
- (b) If  $f_1$  and  $f_2$  are integrable on  $[a, b]$  then prove that  $f_1, f_2$  is also integrable on  $[a, b]$ . [6]
- 3. (a) Prove that  $\int_0^3 x d([x] - x) = \frac{3}{2}$ , where  $[x]$  denotes greatest integer not exceeding  $x$ . [6]
- (b) Define Cauchy sequence and prove Cauchy's general principle of convergence for sequence. [6]

(P.T.O...)

[2]

4. (a) Prove that a sequence of function  $\{f_n\}$  defined on  $[a, b]$  converges uniformly on  $[a, b]$  if and only if for every  $\epsilon > 0$  there exist an integer  $N$  such that [6]

$$|f_n(x) - f(x)| < \epsilon, \forall n \geq N, x \in [a, b]$$

- (b) Show that the series [6]

$$\frac{x}{1+x} + \frac{x}{(1+x)(1+2x)} + \frac{x}{(1+x)(1+2x)(1+3x)} + \dots$$

is uniformly convergent on  $[a, b]$ .

5. (a) Prove that every bounded measurable function on  $[a, b]$  is Lebesgue integrable on  $[a, b]$ . [6]

- (b) If  $1 \leq p \leq \infty$  and  $f \in L^p(\mu)$ ,  $g \in L^p(\mu)$  then prove that [6]  
 $f+g \in L^p(\mu)$  and  $\|f+g\|_p \leq \|f\|_p + \|g\|_p$ .

6. (a) If  $f$  is Lebesgue integrable on  $[a, b]$  and  $\left| \int_a^b f \cdot dx \right| \leq \int_a^b |f| dx$ , [6]

then when does the equality hold? Justify your answer with suitable example.

- (b) State and prove Lebesgue theorem on bounded convergence. [6]

7. (a) State and prove Holder's inequality. [6]

- (b) Distinguish between Riemann integral and Lebesgue integral. [6]

8. Write short notes on (any two) [6+6]

(a) Uniform convergence of series.

(b) Existence of integral

(c)  $L^p$  spaces.

(d) Minkowski's inequality.

**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019****Sub: MATHEMATICS**

Full Marks: 60

**Paper: 102**

Time: 4 Hours

*Answer the questions as per instruction.**The figure in the right hand margin indicate marks.**Question No. 1 is mandatory.***1. Answer any SIX questions given below. [2x6]**

- (a) State Riemann condition of integrability of a function  $f(x)$  in  $[a, b]$ .
- (b) Write down the properties of integration.
- (c) Define the term uniform convergence with respect to sequence.
- (d) Give the relation between continuity, differentiability and integrability.
- (e) Define Lebesgue measurable sets in  $\mathbb{R}^n$ .
- (f) Distinguish between outer measure and Lebesgue measure.
- (g) Define Banach space.
- (h) State Minkowski's inequality.

**Answer any FOUR questions.**

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(P.T.O...)

[2]

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$$|f_n(x) - f(x)| < \epsilon, \forall n \geq N, x \in [a, b]$$

- (b) Show that the series [6]

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- (b) If  $1 \leq p \leq \infty$  and  $f \in L^p(\mu)$ ,  $g \in L^p(\mu)$  then prove that [6]  
 $f+g \in L^p(\mu)$  and  $\|f+g\|_p \leq \|f\|_p + \|g\|_p$ .

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7. (a) State and prove Holder's inequality. [6]

- (b) Distinguish between Riemann integral and Lebesgue integral. [6]

8. Write short notes on (any two) [6+6]

(a) Uniform convergence of series.

(b) Existence of integral

(c)  $L^p$  spaces.

(d) Minkowski's inequality.



**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.- SOCIOLOGY**

Time: 4 Hours

**PAPER : 102**

Full Marks: 80

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[2 x8

**1. Answer any EIGHT of the following.**

- i) What is research design?
- ii) Differentiate between descriptive and exploratory research design.
- iii) What is sampling?
- iv) Explain experimental research design.
- v) What is social research?
- vi) Define hypothesis.
- vii) Define Geneology.
- viii) What is sampling errors.
- ix) What is snow ball sampling?
- x) Explain stratified random sampling.

**Group - B**

[16 x 4]

**Answer Any FOUR questions.**

2. Discuss various types of sampling. Justify its rationale in sociological research.
3. Why 'Interview Scheduled' is the most preferred tool for collection of primary data in sociological research? Justify.
4. What is a questionnaire? What are the considerations in the preparation of questionnaire?
5. Compare Qualitative approach with the quantitative approach in sociological research.
6. Define social research and discuss the major steps in research.
7. Discuss various type of research design.
8. Describe the purpose of Social Survey.
9. Discuss the type and significance of context analysis.



**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019**

**Sub: POL. SCIENCE**

Full Marks: 80

**Paper: 102**

Time: 4 Hours

*Answer the questions as per instruction.  
The figure in the right hand margin indicate marks.  
Question No. 1 is mandatory.*

**GROUP-A**

**1. Answer any EIGHT questions given below.**

[2x8]

- (a) "Justice is the interest of the stronger"- Explain.
- (b) "The state is prior to the individual"- Comment
- (c) Aristotle's concept of slavery
- (d) Hobbes social contract
- (e) Machiavelli's concept of state
- (f) Leviathan
- (g) Locke's concept of social contract
- (h) Locke on individualism
- (i) Difference between Actual Will and Real Will
- (j) Rousseau on Human Nature

**GROUP-B**

**Answer any FOUR questions.**

[16x4]

2. "If political power and scientific knowledge (philosophy) are not united in one person, then there is no end of evil for the state and also for mankind in general". - Discuss
3. What, according to Aristotle, should be the nature and organisation of Ideal State

(P.T.O...)

[2]

4. Machiavelli stands on the twilight zone of the mediaval and modern political thought". Expand
5. Critically examine Hobbes theory of sovereignty.
6. Examine the claims of Hobbes to be considered the greatest modern political philosopher.
7. Assess the place of Locke in the history of political philosophy.
8. Estimate the contribution of Russeau to political thought.

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No. of Pages: 2

GACR

**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

**Sub.- BOTANY**

Time: 4 Hours

**PAPER : 102**

Full Marks: 60

*The figure in the right hand margin indicate marks.*

*Question No.1 is compulsory, answer any FOUR from the rest.*

**Group - A**

[6 x 2

1. Answer any SIX of the following.

- a) What is test cross?
- b) Define genic balance theory of sex determination.
- c) Describe multiple allelism.
- d) What is complete linkage?
- e) What is a polygene?
- f) Define pleiotropism.
- g) What are mutagens?
- h) Differentiate between phenotype & genotype.

*P.T.O.*

[2]

**Group - B**

[12x 4

**Answer Any FOUR questions.**

2. Briefly define chloroplast genome.
3. Define sex determination mechanism in *Melandrium*.
4. Describe role of polyploidy in crop improvement.
5. Describe the mechanism of crossing over.
6. Write notes on:
  - a) Polygene
  - b) zz – zw system
7. Differentiate between
  - a) Euploidy and Aneuploidy
  - b) Monohybrid cross and Dihybrid cross
8. Describe the mechanism of point mutation.

[6x2

**PG, 1<sup>ST</sup> SEMESTER EXAMINATION-2019**

Sub: MCS (Data Structure)

Full Marks: 80

Paper: MCS-102

Time: 4 Hours

*Answer the questions as per instruction.  
The figure in the right hand margin indicate marks.  
Question No. 1 is mandatory.*

**GROUP-A**

**1. Answer any EIGHT questions given below.**

[2x8]

- (a) What is time complexity? Why analyzing time complexity of an algorithm is essential?
- (b) What do you mean by abstract data type?
- (c) Evaluate the following possible expression  
3, 116, 2, +, \*, 12, 6, 1
- (d) Consider an empty circular queue of size 5, what will be the content of queue after following operations.  
Insert (8), insert (11) delete,  
Insert (5), Insert (19) delete, delete  
Insert (20), Insert (21), delete.
- (e) Explain the concept of Radix sort.
- (f) Create a binary search tree from following nodes  
J, A, N, U, A, R, Y
- (g) When does a best cases worst case occurs for a binary search tree.
- (h) Define adjacency matrix.
- (i) What is AVL tree?
- (j) Compare single linked list and double linked list.

[2]

**GROUP-B**

**Answer any FOUR questions.**

2. (a) What is sparse matrix? How do you represent a sparse matrix. [8]  
(b) Describe different asymptotic rotations with examples. [8]
3. (a) Write a C program to implement all operations of an array based circular queue. [8]  
(b) Write the algorithm to evaluate a postfix expression. [8]
4. (a) Represent a stack in 1.D array. Write functions for push and POP operations. [8]  
(b) What do you mean by double ended queue. Explain following operations on DE queue. [8]  
(i) Insert at front  
(ii) Delete at Rear
5. (a) Describe BFS algorithm in Detail. [8]  
(b) Write a program to create a circular linked List of 5 nodes. [8]
6. (a) Construct a binary tree for following pre order and in order traversal [8]  
Pre: ABCDFHJMKEGILN  
In: ABJMHKFCINLGE
- (b) What is B tree? Construct a B tree of order 3 from following data 70, 60, 50, 30, 10, 9, 25, 35. [8]
7. (a) Given the items: 30, 10, 40, 20, 50, 25, 90, 80 first build a heap, then apply heap sort algorithm to sort the items. [8]

[3]

- (b) Explain quick sort algorithm. Show step by step procedure to sort following items. [8]

10, 20, 30, 5, 15, 20, 90, 40

[4x4]

8. Write short notes on (any Four)
- (a) Priority Queue.
  - (b) Adjacent list
  - (c) Amortized Analysis
  - (d) Expression Tree
  - (e) Primitive Data structure
  - (f) Graph Traversal.

- x - x - x -



**GACR**  
**PG 3<sup>rd</sup> SEMESTER EXAMINATION 2019**

Subject: CHEMISTRY

PAPER: CH-102

Full Mark: 60

Time: 3 hour

*Answer all questions as per instruction*

**SECTION -A**

Answer any SIX questions

(2x6)

1. (a) Explain why the rate of solvolysis with water increases as following series is traversed  
 $\text{PhCH}_2\text{Cl}$              $\text{Ph}_2\text{CHCl}$              $\text{Ph}_3\text{CCl}$
- (b) Explain why the following bicyclic compound is unreactive towards nucleophilic substitution either by  $\text{S}_{\text{N}}1$  or  $\text{S}_{\text{N}}2$  mechanism.

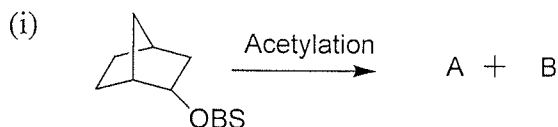


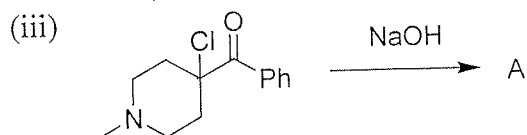
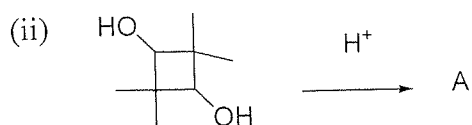
- (c) What is the intermediate in Curtius rearrangement?
- (d) Give an example of Baeyer-Villiger reaction.
- (e) What is meant by ipso-substitution? Give an example.
- (f) Both ortho and meta bromoanisole give the same product on treatment with  $\text{NaNH}_2$  and  $\text{Liq NH}_3$ . Account for this with appropriate mechanism.
- (g) Why does the orientation of HBr addition to 2-methylpropene in presence of peroxide differ from that of addition in absence of peroxide?
- (h) What is Saytzeff's rule?

**SECTION -B**

Answer any FOUR questions

2. (a) Discuss the effect of solvent on reactivity of Nucleophilic substitution reaction (06)
- (b) What is Neighboring group participation? Explain with suitable example. (06)
3. (a) Write notes on (12)
- (i) Favorskii rearrangement
- (ii) Fries rearrangement
- (iii) Wittig olefination
4. (a) Predict the products (A, B) and suggest the possible mechanism (12)





5. (a) Give the evidence for the formation of benzyne intermediate. Discuss the elimination-addition mechanism for nucleophilic aromatic substitution reaction (06)
- (b) Discuss the general mechanism of aromatic electrophilic substitution reaction. Draw an energy profile diagram for such a reaction. (06)
6. (a) Write notes on (12)
- (i) Sommet-Hauser rearrangement
- (ii) Von-Ritche reaction
- (iii) Vilsmeier reaction
7. (a) What is sandmeyer reaction? Explain how chlorobenzene and bromobenzene can be synthesized from benzenediazonium salt. (06)
- (b) Explain Arenium ion mechanism with suitable example (06)
8. (a) Discuss the various factors which affect the extent of E1 and E2 elimination reaction. (06)
- (b) Discuss the mechanism and orientation in pyrolytic elimination (06)

**PG 1<sup>st</sup> SEMESTER EXAMINATION-2019**

Sub.- PHYSICS

Time: 4 Hours

PAPER :102

Full Marks: 60

*The figure in the right hand margin indicate marks.**Question No.1 is compulsory, answer any FOUR from the rest.***GROUP -A**

[2 x 6

**1. Answer any SIX questions of the following**

i) State Cauchy's residue theorem.

ii) Find residue of  $\frac{z}{(z-a)(z-b)}$  at  $\infty$ 

iii) Explain the rank of Tensor

iv) What are the symmetry properties of Tensor?

v) Write Bessel differential equation and its generating function.

vi) Sketch the graphical representations of Bessel functions  $J_0(x)$ ,  $J_1(x)$ , and  $J_2(x)$  with  $x$ .vii) What is Neumann function  $N_\nu(x)$  and write its Wronskian.

viii) Write orthogonality and completeness relation of Lagrange differential equation.

**GROUP-B**

Answer Any FOUR questions.

[12x4]

2. i) Prove that if  $f(z)$  is analytic at all points on and inside a simple closed contour  $C$ , then

$$\int_C f(z) dz = 0$$

[6]

- ii) Using suitable contour, evaluate the integral:

$$\int_0^{2\pi} \frac{d\theta}{5 + 4 \sin \theta}$$

[6]

3. Evaluate the following using the contour integration

[12]

$$(i) \int_0^{\infty} \frac{\cos x}{x^2 + a^2} dx \quad (ii) \int_0^{2\pi} \frac{\cos z \theta d\theta}{5 + 4 \cos \theta}$$

$$(iii) \int_{-\infty}^{\infty} \frac{\sin x}{x_{12}} dz$$

4. i) Define covariant contravariant and Pseudo tensors. Give at least one example in each case.

[6]

- ii) Calculate the Christoffel symbols in cylindrical polar co-ordinate.

[6]

5. i) Show that the Kronecker delta symbol is a mixed tensor of rank 02.

[6]

- ii) Show that Levi-civita symbol is a tensor of rank 03.

[6]

6. i) For the Bessel function  $J_n(x)$  show that

[6]

$$J_{-1/2} = \sqrt{\frac{2}{\pi x}} \cos x \quad \text{and}$$

$$J_{-n}(x) = (-1)^n J_n(x)$$

- ii) Write brief note of the following

[6]

a) Hankel function

b) Rayleigh's formula

7. i) Show that the Laguerre polynomial  $L_n(x)$  can be represented by

[6]

$$L_n(x) = \frac{e^x}{n!} \frac{d^n}{dx^n} (x^n e^{-x})$$

- ii) Establish the orthogonality of Laguerre polynomial.

[6]

