

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

Sub.- HINDI

Time: 4 Hours

PAPER : MHD - 304

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**

[2x3]

1. निम्नलिखित किन्हीं आठ प्रश्नों के संक्षिप्त उत्तर दीजिए।
  - क) स्कन्दगुप्त नाटक में कुल कितने अंक हैं?
  - ख) बंधु वर्मा की बहन का नाम क्या है?
  - ग) स्कन्दगुप्त नाटक के किन्हीं दो असत पात्रों के नाम लिखिए।
  - घ) सावित्री की एक चारित्रिक विशेषता लिखिए।
  - ङ) 'आधे-अधुरे' शीर्षक का अर्थ क्या है?
  - च) 'आधे-अधुरे' में 'रबर का टुकड़ा' किसे कहा गया है?
  - छ) 'कबीर खड़ा बाजार में' नाटक का लेखक कौन है?
  - ज) 'कबीर खड़ा बाजार में' का प्रकाशन वर्ष क्या है?
  - झ) 'माँ' एकांकी का उद्देश्य क्या है?
  - ञ) 'तौलिए' किसके प्रतीक हैं?

## GROUP - B

( निम्नलिखित किन्हीं चार प्रश्नों के उत्तर दीजिए)

[16x4]

2. 'स्कन्दगुप्त' नाटक मे प्रसादजी की नारी भावना पर प्रकाश डालिए।
3. 'स्कन्दगुप्त' का चरित्र चित्रण कीजिए।
4. 'आधे-अधुरे' नाटक के वर्णित कामकाजी महिलाओं की समस्याओं पर प्रकाश डालिए।
5. भाषा-शैली की दृष्टि से 'आधे-अधुरे' नाटक की समीक्षा कीजिए।
6. 'कबीर खड़ा बाजार में' नाटक के कथानक की समीक्षा कीजिए।
7. एकांकी कला की के दृष्टि से 'माँ' अथवा 'एक तोले अफीम की कीमत' एकांकी की आलोचना कीजिए।



PG, 3<sup>RD</sup> SEMESTER EXAMINATION-2019

Sub: ODIA

Full Marks: 80

Paper: 304

Time: 4 Hours

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

କ-ବିଭାଗ

[2x8]

e. ଯେକୌଣସି ୮ ଗୋଟି ପ୍ରଶ୍ନର ଉତ୍ତର ଦିଅ ।

(କ) ଧୂଳିର ପ୍ରକାର ଭେଦ ।

(ଖ) ରାତି କେତେ ପ୍ରକାରର ?

(ଗ) ଉତ୍ପ୍ରେକ୍ଷା ଅଳଙ୍କାର କାହାକୁ କୁହନ୍ତି ?

(ଘ) ଗୋଟିଏ ମାଳୟମକର ଉଦାହରଣ ଦିଅ ।

(ଙ) ମାଳାଳଙ୍କାର ଓ ଅର୍ଥାଳଙ୍କାର ମଧ୍ୟରେ ପାର୍ଥକ୍ୟ ଦୁଇଗୋଟି ବାକ୍ୟରେ ଲେଖ ।

(ଚ) ନାଟ୍ୟଶାସ୍ତ୍ରର ରଚୟିତା କିଏ ଓ ସେ କେଉଁ ସମୟର ମଣିଷ ।

(ଛ) ସାହିତ୍ୟ ଦର୍ପଣର ଲେଖକ କିଏ ?

(ଜ) ଓଡ଼ିଶା ଓଡ଼ିଆ ସପ୍ତକରେ ତିନୋଟି ବାକ୍ୟରେ ଲେଖ ।

(ଝ) ଦାସ କ୍ୟାପିଟାଲର ଲେଖକ କିଏ ଏବଂ ସେ କେଉଁ ଦେଶର ବ୍ୟକ୍ତି ?

(ଞ) ମୋଦଲେଆର କେଉଁ ଦେଶର କବି ଏବଂ ତାଙ୍କ କବିତାର ବିଶେଷତା ।

ଖ-ବିଭାଗ

[16x4]

(ଦୀର୍ଘ ଉତ୍ତର ମୂଳକ ପ୍ରଶ୍ନ- ଯେକୌଣସି ୪ ଟିର ଉତ୍ତର ଲେଖ)

୧. ରାତି ଓ ଗୁଣ ମଧ୍ୟରେ ସମ୍ପର୍କ ରହିଛି କିପରି ? ଉଦାହରଣ ମାଧ୍ୟମରେ ପ୍ରମାଣ କର ।

୩. ଅଳଙ୍କାର କାବ୍ୟର ସୌନ୍ଦର୍ଯ୍ୟ ବିଧାୟକ ବିଭବ ନୁହେଁ- ରସବୋଧ ସହିତ ଏହାର ସମ୍ପର୍କ ରହିଛି- ଆଲୋଚନା କର ।

୪. ବକ୍ରୋକ୍ତିର ସଂଜ୍ଞା ଓ ପ୍ରକାର ଭେଦ ସମ୍ପର୍କରେ ଚର୍ଚ୍ଚା କର ।
୫. ଧ୍ୱନିକୁ ମଧ୍ୟ କାବ୍ୟର ଆତ୍ମା ଭାବରେ ବିବେଚନା କରାଯାଏ କାହିଁକି ?
୬. ଅସ୍ତ୍ରଦ୍ୱବାଦ ଏକ ଦର୍ଶନ । ଓଡ଼ିଆ ଉପନ୍ୟାସରେ ଏହି ଦର୍ଶନ କିପରି ପ୍ରତିଫଳିତ ଆଲୋଚନା କର ।
୭. ରେମାଂଚିସିଜମ୍ ଲକ୍ଷଣ ଆଧାରରେ ପଢ଼ିଥିବା ଯେକୌଣସି କବିତାର ଚର୍ଚ୍ଚା କର ।
୮. ସାମ୍ୟବାଦ କାହାକୁ କୁହାଯାଏ । ଏହି ଭାବାଦର୍ଶି ଆଧାରିତ ଗୋଟିଏ ଗପ ବିଷୟରେ ଆଲୋଚନା କର ।
୯. ବାସ୍ତବବାଦ ଓ ସାମ୍ୟବାଦ ମଧ୍ୟରେ ସମ୍ପର୍କ ରହିଛି କି ? ଦର୍ଶାଅ ।

**PG, 3<sup>RD</sup> SEMESTER EXAMINATION-2019**

**Sub: POL.SCIENCE**

Full Marks: 80

**Paper: 304**

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.**

[2x8]

- (a) What is MS Word in computer?
- (b) Write two advantages of E-Mail.
- (c) Define Internet.
- (d) What do you mean by Research?
- (e) Write two important characteristics of Hypothesis.
- (f) Write down two important methods of Data collection.
- (g) Explain Social Research.
- (h) What do you understand by schedules?
- (i) What is questionnaire?
- (j) Mention two important steps in Report writing.

**GROUP-B**

**Answer any FOUR questions.**

[16x4]

2. Discuss the fundamentals of computers. What are their applications and advantages?
3. Define E-mail. Discuss its various utilities in the field of information technology.
4. What do you mean by scientific method? Explain its nature and application to Social Research.

(P.T.O...)

[2]

5. Discuss the meaning and utility of Hypothesis in social research. Analyse the characteristics of a good hypothesis.
6. Critically examine 'Interview' and 'Observation' as methods of Data Collection.
7. What is questionnaire? Discuss the main points that you will take into account while drafting a questionnaire.
8. Define report writing. What are the different steps in writing report in Social Research?

- x - x - x -

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

**Sub.- HISTORY**

Time: 4 Hours

**PAPER : 304**

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. **Write brief notes on any EIGHT of the following.**
- What do you mean by Numismatics. Which ancient ruler issued punch marked coins.
  - Which foreign traveller visited India during Mauryan rule and what is the name of his travel accounts.
  - What do you mean by Bibliography?
  - What Epigraphy does mean? Who was the author of the Allahabad Prasasti?
  - Who wrote Rajatarangini and to which state did he belong?
  - Who said that "History consists of a corpus of facts?"
  - What do you mean by Email?
  - How many types of hypothesis are followed in Research?
  - What do you mean by folk lore?
  - Why Royal Asiatic Society was founded and in which year?
  - In which year the Archaeological Survey of India was established?

**Group - B**

[16 x 4

**Answer Any FOUR questions.**

2. Give an account of the Archival Sources of History.
3. What do you mean by Hypothesis in Research. Describe about various types of Hypothesis.
4. Define causation? Describe modern notions of causation.
5. Examine the advantages of generalisation for a student of history.
6. Describe objectivity as a tool of historical research.
7. Describe the merits of using MS Word, PowerPoint and E-mail in Research.
8. Assess the process for imagining the past.
9. Give an account of the literary sources of Indian History.





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

**Sub.- BOTANY**  
**PAPER : 304**

Time: 4 Hours  
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 of the following.

- i) Indicate flower parts of *Arabidopsis* mutants.
- ii) Write the principle of histogen theory.
- iii) Mention two types of tapetum and state their organization.
- iv) What are crassinucellate ovules.
- v) How does helobial endosperm develop?
- vi) Mention the components of a normal embryo sac.
- vii) What is totipotency?
- viii) What are nodal explants?

[2]

## **Group - B**

[12x 4

**Answer any FOUR questions.**

2. Give an account of metabolic changes associated with senescence and its regulation.
3. Illustrate root-stem transition.
4. Describe pollen-pistil interactions.
5. Give an account of pollination mechanisms and vectors associated with it.
6. Discuss the structure and development of typical dicot embryo.
7. Describe how Agrobacterium-mediated gene transfer takes place.
8. Write notes on:
  - a) Ovule structure
  - b) Ms media components.



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

**Sub.- MCO  
PAPER : 304**

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.*

1. **Answer any EIGHT of the following.** [2 x 8]
- i) Distinguish between a primary market and a secondary market.
  - ii) Clarify financial assets giving examples.
  - iii) Distinguish between new issue market and stock exchange.
  - iv) What do you mean by listing a stock exchange?
  - v) Define merchant banking and list its functions.
  - vi) State the qualities required for a merchant banker.
  - vii) Who are the parties to a credit card?
  - viii) State the objectives of CRISIL.
  - ix) What are special features of an open-ended fund?
  - x) Distinguish between hire purchase and lease.

## **Section - B**

[16x 4

**Answer any FOUR questions.**

2. Show the classification of Indian financial markets in the form of a chart and explain the features of each market.
3. Discuss the role of financial system in the economic development of a country.
4. Make a comparison between stock exchange OTCEI and NSE.
5. What is merchant banking? Explain in detail the pre-issue management and post-issue management.
6. Mutual Funds provide stability to share prices, safety to investors and resources to prospective entrepreneurs. Discuss.
7. Explain the methodology followed by crisis in rating credit instruments.
8. Distinguish between factoring and forfaiting and state the scope for the introduction of such service in India.



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

**Sub.- SOCIOLOGY**

Time: 4 Hours

**PAPER : 304**

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.

- a) What do you mean by social movement?
- b) Write any two aims of Arya Samaj.
- c) What is Relative Deprivation?
- d) Mention main two aims of Brahmo Samaj.
- e) What is Political Conciseness?
- f) Write two methods and techniques in movement studies.
- g) What are the basic aims of Ramakrishna movement?
- h) Find out the causes of Nationalist movements?
- i) What are the bases of Identity?
- j) Mention any two causes of post-independent Tribal movement.

[2 ]

**Group - B**

[16 x 4

**Answer Any FOUR questions.**

2. Describe the concept of Social movement and discuss its types.
3. Examine the origin and ideology of Arya Samaj.
4. Explain various causes of labour and Trade Union movement.
5. Write an essay on Ramakrishna Mission and the role of Swami Vivekananda.
6. Trace out the relations between Social movements and political consciences.
7. Analyse various causes and consequences of Peasant movement in India.
8. Discuss the major causes of tribal movements in pre-independent India.



**PG, 3<sup>RD</sup> SEMESTER EXAMINATION-2019**

**Sub: PSYCHOLOGY**

Full Marks: 60

**Paper: 304**

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 SIX questions.**

[2x6]

- (a) Mental health
- (b) Strength of eastern positive psychology.
- (c) Virtues of western positive psychology.
- (d) Resilience
- (e) Hope and optimism
- (f) Mind-body relations
- (g) Positive and negative attitude
- (h) Cultivating gratitude

**GROUP-B**

**Answer any FOUR questions.**

[12x4]

- 2. Discuss the goal of positive psychology along with its application.
- 3. Define positive psychology. Explain different perspectives on positive psychology.
- 4. State the values and importance of positive thought in the lives of individuals.
- 5. Highlight the relationship between positive thinking and health.

(P.T.O...)

[2]

6. What is happiness? Discuss the nature and sources of happiness.
7. Elucidate the process of management of emotions, attitudes and memory for positive growth.
8. Define attitude. Analyse different components of attitude.

- x - x - x -



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

**Sub.- Mathematics (C++)**  
**PAPER : P-304**

Time: 3 Hours  
Full Marks: 60

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

1. **Answer any SIX of the following.** [6 x 2]
- a) What is function over loading? Give an example.
  - b) What is implicit and explicit type conversion?
  - c) Define friend function.
  - d) Explain constructor. What are different types of constructor?
  - e) What is runtime polymorphism? Explain.
  - f) Write a short program in C++ to illustrate the multiple inheritance concept.
  - g) Write the syntax of the following in C++  
(i) Do..... while           (ii) Go to
  - h) What are default arguments? Illustrate them.

**Answer any FOUR questions.**

2. a) Explain looping structures in C++ with example. [6]
- b) Write a C++ program to count number of vowels and convert all uppercase to lowercase and vice-versa in a text file. [6]

3. a) Explain call - by- value and call-by- reference with illustration. [6]  
b) Write a C++ program to concatenate two strings using binary operator '+'. [6]
4. a) Explain Private, public and protected visibility specifiers with respect to inheritance. [6]  
b) Write a program to perform addition of two matrices using operator over loading. [6]
5. a) Explain the concept of function over loading and operator over loading with example. [6]  
b) Differentiate between static data member and static member function. [6]
6. a) Distinguish between constructors and destructors and explain how they differ from normal function with example. [6]  
b) Write a C++ program to print reverse of a string using recursion. [6]
7. a) What is type conversion. What are advantages of type conversion. Give an example of implicit type casting. [6]  
b) Describe the use of control structures with suitable example. [6]
8. Write short notes on any TWO. [6+6]
  - a) Virtual function
  - b) Arithmetic 'if' operator
  - c) In line function.



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

**Sub.- ZOOLOGY**  
**PAPER : P-304**

Time: 4 Hours  
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 of the following.**

- a) Define a flagship species with examples.
- b) What do you mean by meristic characters?
- c) Define curation.
- d) What are the different kinds of publications?
- e) What is a clade?
- f) How can immunology help taxonomy?
- g) What is a microfossil?
- h) Make a list of the reptilian character of Archaeopteryx?

[2]

**Group - B**

[12x 4

**Answer any FOUR questions.**

2. Give an account of the species concept studied by you.
3. Discuss the operative principles of ICZN.
4. Explain the major features of preparation of a manuscript for publication.
5. What are the various newer trends in taxonomy?
6. Give an account of the evolution of vertebrates.
7. Write notes on:
  - a) Shannon-winner index
  - b) Flightless birds
8. Explain the followings:
  - a) Molecular systematics
  - b) Attributes of biosystematics.



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

**Sub.- STATISTICS  
PAPER : 304**

Time: 4 Hours  
Full Marks: 60

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

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

**Section- A**

[2 x 6

1. **Answer any SIX of the following.**
- What do you mean by Gini Concentration ratio?
  - What is Population Pyramid?
  - Explain the concepts of Leslie matrix.
  - Explain the concept of Brass Polynomial model.
  - Explain two uses of stable population.
  - Differentiate between Fecundity and fertility.
  - Explain stationary and stable population. State the situation when the age distribution to two stable populations would be identical.
  - Differentiate between Age heaping and age shifting.

**Section - B**

[12x 4

**Answer any FOUR questions.**

2. Briefly explain Lotka's model for Stable population.
3. What is life table? Explain the structure of Complete Life Table and also explain its uses.
4. a) What are the assumptions of a stable population model? How can the stable population theory be applied to a quasi stable population? Explain.  
b) Briefly explain migration model.
5. a) Explain four problems associated with measuring migration.  
b) Describe the problems associated with migration analysis.
6. What do you mean by fertility of a population? Define CBR, GFR and TFR. Discuss the relative merits and demerits as measure of fertility.
7. Write short notes on : (Any TWO)
  - a) Coale Trussel model
  - b) Net Nuptality table
  - c) Lexis Diagram
  - d) Greville Life table



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

**Sub.- MCS (Database Engineering)**  
**PAPER : P-304**

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.*

1. **Answer any EIGHT of the following.** [2 x 8]
- What is data Redudancy?
  - Explain Normalisation and denormalisation.
  - Enlist the advantages of SQL.
  - Explain the terms. 'Record' , 'Field', 'Table' in terms of data base.
  - What is the data base transaction?
  - What is data warehousing?
  - Define Phantomdeadcock.
  - What is Functional dependancy?
  - What is Armstrong's Axioms?
  - What is an explain plan?

**Group - B**

**Answer any FOUR questions.**

- What is a Hirarchical database model? How the data are organised. Explain in detail. [8]
- What is Query optimization? Establish Reductional Algebra of Qurey optimization. [8]

3. a) What is Transaction processing system? How it helps in Information system? [8]  
b) Define Normalization. Enlist the advantages of Normalizing data base and compare with de-normalization. [8]
4. a) Define Database language and its type & use in database. [8]  
b) Define Join & enlist it's type with example. [8]
5. a) Describe the steps for Query optimization in distributed DBMS. [8]  
b) Explain rule regarding Functional dependencies. [8]
6. a) What is the ER model? Why we use ER model? Explain the components of ER model. [8]  
b) What is Integrity constraints? Explain types of Integrity conotrait with example. [8]
7. a) What is conflict serializability in DBMS? [8]  
b) Describe types of schedules in DBMS.
8. Write notes on: (Any FOUR) [4x 4]
  - a) SQL
  - b) DML
  - c) Cursor type
  - d) Index hunting
  - e) Fragmentation





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

**Sub.- ENGLISH  
PAPER : P-304**

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**

[2 x 8

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

- a) What do you understand by reader oriented translation?
- b) What are lexical items?
- c) What do you understand by interpretation of text?
- d) What is Target language?
- e) What is meant by dialects?
- f) What is paraphrase in literature?
- g) What is a source text?
- h) What is translated text?
- i) Explain back-translation technique.
- j) What do you mean by free translation.

[2]

**Group - B**

[16x 4

**Answer any FOUR questions.**

2. Discuss various types of translation methods.

OR

What are the basic principles of Translation.

3. Discuss the process of translation.

OR

Explain in detail about restructuring the translated material.

4. What are the linguistic problems faced during translation.

OR

What is the difference between the language of literary and non literary text?

5. What are the rules that are followed while comparing source text and translated text?

OR

How to evaluate several translated versions of the same text?



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

Sub.- ECONOMICS

Time: 4 Hours

PAPER : 304

Full Marks: 80

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

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

1. Answer any EIGHT questions of the following [2 x 8

- a) Horticulture
- b) Capitalist Agriculture
- c) Corporate farming
- d) Agri Business and Agro Business
- e) Land rights and women of India.
- f) Marginal farmers and small farmers
- g) AGMARK
- h) Integrated scheme for Agricultural marketing (ISAM)
- i) Status & Tenancy farming in India.
- j) Multiple cropping

[16x4

**Answer Any FOUR questions.**

2. Is agriculture economics an applied science?  
Justify your answer.

OR

Share of agriculture to India's GDP has been reducing in the present scenerio. Is it good for the economy? Give reasons in support of your opinion..

3. There is a shift in the trend of consumption of food grain and horticulture product after 2011 in India. Why do you think the shift occurred.

OR

What are the steps taken by the Government towards development of marine products / market in India.

4. What causes farmer's suicide in India? What more can be done to prevent it.

OR

Critically examine the relation between area under production of agricultural goods and its productivity.

5. Discuss the role of genetically modified food towards India's GDP. Do you support the production of these high valued goods for better revenue generation? Why?

OR

Discuss the role of NABARD towards development of small and marginal farmers.

6. What is the relation between Jan Dhan Yojna and dependence on informal source of credit with respect to agriculture farmers. Discuss.

OR

'Role and status of SHGs in agricultural products has improved over the years;. Justify.



[ 4 ]

Draw  $I_D$  vs  $V_{DS}$  curve for an n-channel enhancement mode MOSFET .

ii) Where one can use Gunn diode and impatt diode? Discuss the working of a IMPATT diode [2 + 4

7. i) Draw an equivalent circuit for SCR. What is turn-on condition and discuss the operation of SCR with I-V characteristics. [ 4

ii) What is population inversion? Discuss optical activity for lasing action. If  $N \gg 1$  show that the wavelength separation between adjacent resonant modes is [ 4

$$\Delta\lambda = \frac{\lambda^2}{2L}$$

iii) What is the difference between Diac and Triac? Discuss the working of a Diac with a neat diagram. [ 4



No. of Pages: 4

GACR

PG 3<sup>rd</sup> SEMESTER EXAMINATION-2019

Sub.- PHYSICS

Time: 4 Hours

PAPER : 304

Full Marks: 60

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

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

### Section- A

[2 x 6

1. Answer any SIX questions of the following

i) What are the characteristics of varactor found from p-n junction?

ii) Why does the space charge change which increase with reverse bias voltage.

iii) For LED, what is the significance of Snell's law.

iv) What is photon energy for green light of  $0.5 \mu\text{m}$  wave length ?

v) State three major differences between photodiode and solar cell.

vi) Why the breakdown voltage of a p-n junction does decreases as the doping concentration increases?

vii) Why switching speed for Schottky diode is faster than p-n junction diode?

viii) What is meant by base width modulation or early effect?

P.T.O.

[ 2 ]

**Answer Any FOUR questions.**

2. i) How depletion region is formed and modulated in a p-n junction diode with forward and reverse biased condition ? [2]

ii) Show the energy band diagram, electric field in depletion region of a p-n junction in thermal equilibrium. [4]

a) before junction is formed

b) after junction is formed

iii) How a built-in potential develops in a p-n junction diode? Calculate the built-in potential in silicon p-n junction at 300 K for [6]

$$N_a = 5 \times 10^{17} \text{ cm}^{-3}, N_d = 1 \times 10^{16} \text{ cm}^{-3} \quad \text{and}$$

$$\text{assume } n_i = 1.5 \times 10^{10} \text{ cm}^{-3}$$

3. i) Draw a voltage amplifier circuit of a npn BJT with CE configuration and establish relation. [3]

$$a = \frac{\beta}{1 + \beta}$$

ii) A particular transistor has an output resistance of  $200 \text{ k}\Omega$  and early voltage of  $V_A = 125 \text{ V}$ . Determine the change in collector current when  $V_{CE}$  increases from 2V to 8V.

[ 3 ]

4. i) What are the different contacts for MOSFET and MESFET for source and drain? [2]

ii) What is transconductance of MOSFET? Show that  $I_D$  increases linearly with  $V_{DS}$  but is independent of  $V_{GS}$  in the non-saturation region [4]

iii) For a n-channel GaAs MESFET at 300K with gold Schottky barrier contact the barrier height is  $\Phi_{Bn} = 0.89 \text{ V}$ . The n-channel doping is  $N_d = 2 \times 10^{15} \text{ cm}^{-3}$ . Design the channel thickness such that  $V_T = 0.25 \text{ V}$ . [6]

5. i) What is avalanche breakdown? Write down the breakdown condition and calculate the breakdown voltage for Si one sided  $P^+ - n$  abrupt junction with  $N_d = 5 \times 10^{16} \text{ cm}^{-3}$ . The critical field is  $5.7 \times 10^5 \text{ V/cm}$ . [6]

ii) What is Zener breakdown? In an ideal characteristic behavior of p-n diode, draw the depletion region, energy band diagram and carrier distribution for [6]

a) Forward biased

b) Reverse biased

6. i) Show the MOSFET structure for [2 + 2+2]

a) n-channel enhancement mode

b) n-channel depletion mode

**GACR**  
**PG 3<sup>rd</sup> SEMESTER EXAMINATION-2019**  
**(SCIENCE)**

SUBJECT: PHYSICAL CHEMISTRY, ID  
PAPER CODE: CH-304

Full Marks: 60  
Time: 3 Hours

**The figures in the right hand margin indicate marks.**  
**Q.no.1 is compulsory. Answer any *Four* from *Section B***  
***Section-A***

**Q1.** Answer any **SIX:** **[2X6]**

- (a) Why microwave spectra are difficult to be observed in case of solids or liquids?
- (b) Which of the following molecules will show IR spectrum  
HCl, CH<sub>4</sub>, CO<sub>2</sub>, H<sub>2</sub>, & N<sub>2</sub>O
- (c) Define Stoke's and antistoke's line?
- (d) State Franck-Condon principle?
- (e) Why water and alcohol are not suitable solvents for ESR studies?
- (f) What is the basis of Mossbauer effect?
- (g) What are K $\alpha$  rays?
- (h) What is TGA analysis used for?

***Section-B***

**Q2.** (a) What is a rigid rotor? How it is different from a non-rigid rotor? Derive expression **[2+4+3]**  
for rotational energy for a rotating molecule?

(b) Calculate the relative population for j=1 for a molecule with B = 2.0 cm<sup>-1</sup> at 300 K. **[3]**  
Where k= 1.38 X 10<sup>-23</sup>.

**Q3.** (a) Draw the Morse potential energy diagram? How anharmonicity affects the **[5+2]**  
molecular vibration?

(b) Define force constant? Calculate the force constant of HCl, where the fundamental **[2+3]**  
vibrational frequency of HCl is 2.890 cm<sup>-1</sup>. Atomic masses of <sup>1</sup>H= 1.673X 10<sup>-27</sup> kg  
and <sup>35</sup>Cl=58.06X 10<sup>-27</sup> kg.

**Q4.** (a) State classical theory of Raman effect? Write four applications of Raman **P.T.O.**

- spectroscopy (without explanation)? [5+2]
- (b) Differentiate between fluorescence and phosphorescence spectroscopy? [5]
- Q5.** (a) Express Raman and Rayleigh scattering? Explain Raman effect in solids, liquids and gaseous molecules? [4+4]
- (b) Write a short note on rotational Raman spectrum? [4]
- Q6.** (a) What is 'g' factor in electron spin resonance spectroscopy? What are the factors affect the 'g' value? Calculate the ESR frequency in a magnetic field of 25000 gauss ( $\beta = 9.274 \times 10^{-24} \text{ JT}^{-1}$ )? [3+4+2]
- (b) Write a short note on application of Mossbauer spectroscopy? [3]
- Q7.** (a) Differentiate between isotropy and anisotropy of 'g' value? The ESR frequency for a free electron is 9000 MHz. Calculate the magnetic field at which the ESR spectrometer is working? [5+2]
- (b) Explain shortly on principle of Mossbauer spectroscopy? [5]
- Q8.** (a) Define Bragg's law? Explain the term (i) lattice plane, and (ii) miller indices with examples? [5+4]
- (b) The first maxima for bragg's diffraction of x-rays from KCl crystal ( $d=0.314 \text{ nm}$ ) appears at  $14^\circ$ . Calculate the energy of incident x-rays? [3]
- Q9.** (a) Discuss instrumentation and application of polarography? [6]
- (b) Explain the general principle of DSC analysis in detail? [6]

----- X -----



**GACR**  
**PG 3RD SEMESTER EXAMINATION 2019**

SUB : EDUCATION  
PAPER : 304

F.M : 60  
TIME : 3 Hrs

*Question No. 01 is compulsory. Answer any FOUR from the rest.*

SECTION - A

- Q1. Answer any SIX of the following : [2x6=12]
- (a) Enumerate the types of education technology comprehensively.
  - (b) What are the different approaches to educational technology?
  - (c) Discuss the importance of educational technology.
  - (d) Explain the relationship between teaching and learning.
  - (e) What is meant by effective communication?
  - (f) What are the principles of good communication?
  - (g) Give three purposes of using mass media in communication.
  - (h) Explain the role of internet in communication.

SECTION - B

*(Answer any FOUR)*

- Q2. “Educational Technology is the scientific application of scientific knowledge about teaching learning and conditions of learning to improve the efficiency of teaching and training.” Justify the statement. [12]
- Q3. Explain the models of teaching and discuss the significance of the teaching models in teaching. [12]
- Q4. Write short notes on : [6+6]
- (a) Role of ICT in educational technology
  - (b) Model of Communication
- Q5. (a) Briefly explain the need and importance of distance education in India. [6+6]  
(b) Explain need and importance of mass communication.
- Q6. (a) Briefly explain Ausubels teaching model. [6+6]  
(b) Need and importance of instructional materials in Distance Education.
- Q7. How can the synectics model be utilize for the development of creativity among students? Discuss by throwing light on its nature and functioning. [12]

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