

+3, 3rd SEMESTER EXAMINATION-2018
(ARTS)
SOCIOLOGY (CORE-V)

Time: 3 Hours

Full Marks: 80

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

1. Answer any EIGHT questions. [2x8]

- (a) What do you mean by basic research. Give an example.
- (b) What is the basic difference between research method and research methodology?
- (c) What do you mean by extraneous variables? Give an example.
- (d) What is the basic necessity of research design?
- (e) What is Ex-post Facto Design?
- (f) What is structured Questionnaire?
- (g) What do you mean by parameter and statistics?
- (h) What do you mean by relational hypothesis? Give an example.
- (i) What do you mean by stratified random sampling?
- (j) What do you mean by context analysis?

Answer any FOUR questions.

2. What do you mean by social research? What are the major steps in social research process. [16]
3. What do you mean by research design? Explain its need, types and significance. [16]

(P.T.O...)

4. (a) What do you mean by hypothesis? Explain its types and characteristics. [8+8]
(b) Explain role of hypothesis in social research.
5. What do you mean by sampling? What are the procedures involved in random sampling with giving advantages and disadvantages? [16]
6. (a) What do you mean by questionnaire? What are the guidelines for preparation of a questionnaire? [8+8]
(b) Explain merits and demerits of survey research.
7. What do you mean by measures of central tendency? Discuss the relative merits and demerits of mean, median and mode used in statistical analysis. [16]
8. (a) What are the merits and demerits of observation as a method of social research? [8+8]
(b) What are the salient features of interview as a technique of sociological research?

No. of Pages: 2

GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(ARTS)

Sub.- Philosophy(Hons.)
(PAPER : Core- V)

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'

[2x8]

1. Answer any EIGHT of the following.
 - i) What is the meaning of Samavyapti?
 - ii) What is extraordinary perception?
 - iii) How does *Nyaya* define perception?
 - iv) What is the meaning of Testimony?
 - v) What is the implication of *Advaita*?
 - vi) Who is the advocate of *Visistadvaitavad*?
 - vii) What is *Swadeha-mukti*?
 - viii) What is the significance of *Vidya*?
 - ix) What is an illusion?
 - x) What is *Niskama karma* ?

[P.T.O.]

Group - 'B'

[16x 4]

Answer any FOUR questions.

2. State and explain perception as source of knowledge as per *Nyaya*.
3. How can *Vyapti* be ascertained? Discuss after *Nyaya*?
4. Discuss Sankar's concept of *Brahman*.
5. Discuss after Sankar the theory of *Jiva* and liberation.
6. How does Ramanuja discard Sankar's *Mayavad*? Discuss.
7. How is *Vidya* distinguished from *Avidya*? Discuss.
8. Give an exposition of the significance of *Jnana Yoga* according to *Gita*.



**+3, 3rd SEMESTER EXAMINATION-2018
(ARTS)**

POL. SCIENCE (Hons: C-V)

Time: 3 Hours

Full Marks: 80

*Answer the questions as per instruction.
The figure in the right hand margin indicate marks.*

SECTION-A

[2x8]

1. Answer any EIGHT of the following:

- (a) What is comparative Govt?
- (b) What is Eurocentrism?
- (c) What is enterprise capitalism?
- (d) Democratic socialism.
- (e) Surrogate Colonialism
- (f) Imperialism
- (g) Judicial powers of British Monarch.
- (h) Removal of the USA President.
- (i) Financial powers of the Swiss Parliament.
- (j) Qualification to become president of China.

SECTION-B

Answer any FOUR.

[16 x 4]

2. What is comparative politis. Discuss its Nature.

OR

Analyse various problems & challenges involved in going beyond eurocentrism.

(P.T.O...)

[2]

3. What is globalization? Discuss various types of globalization.

OR

Critically analyse various elements of socialism.

4. What is colonialism? Discuss various forms of colonialism.

OR

Analyse various causes of Decolonialization.

5. Explain the salient features of British constitution.

OR

Discuss the powers & position of British Prime Minister.

6. Discuss the future of British political economy.

OR

Analyse the constitution development of USA.

7. Discuss the composition & functions of the American Senate.

Or

Discuss the Judicial Review Power of the US Supreme Court.

8. Discuss the constitutional development of Switzerland.

OR

Analysis the political economy of China.

+3, 3rd SEMESTER EXAMINATION-2018

(ARTS)

ODIA (C-V)

Time: 3 Hours

Full Marks: 80

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

କ - ବିଭାଗ

୧. ୧୦ଟି ପ୍ରଶ୍ନର ଉତ୍ତର ଗୋଟିଏ ବା ଦୁଇଟି ବାକ୍ୟରେ ଲେଖ ।

(୨×୧୦)

(କ) ପ୍ରାଚୀନ ଭାରତୀୟ ଆର୍ଯ୍ୟଭାଷାର ସମୟଖଣ୍ଡ କେତେ ?

(ଖ) ପ୍ରାକୃତ ଭାଷାର କେଉଁ ଶାଖା ଦେଇ ଓଡ଼ିଆ ଭାଷା ଉଦ୍ଭବ ହୋଇଛି ?

(ଗ) ଭରତ ମୁନିଙ୍କ ନାଟ୍ୟଶାସ୍ତ୍ରରେ ଓଡ଼ିଆ ଭାଷା କେଉଁ ନାମରେ ପରିଚିତ ?

(ଘ) ଅଶୋକାନୁଶାସନ କେଉଁ ଲିପିରେ ଖୋଦିତ ?

(ଙ) ଓଡ଼ିଆ ଲିପିର କେଉଁ ଅକ୍ଷରଟି ସର୍ବ ପୁରାତନ ?

(ଚ) ଓଡ଼ିଆ ଭାଷାରେ କେତୋଟି ଶିଳାଲେଖ ଆବିଷ୍କୃତ ହୋଇଛି ?

(ଛ) 'ଉରଜାମ୍' ଶିଳାଲେଖଟି କାହିଁକି ପ୍ରସିଦ୍ଧ ?

(ଜ) କେଉଁ ବଂଶର ସମ୍ରାଟ ମାନଙ୍କ ସମୟରେ ସର୍ବାଧିକ ଓଡ଼ିଆ ଶିଳାଲେଖ ଖୋଦିତ ହୋଇଥିଲା ?

(ଝ) 'ସନ୍ଧାଭାଷା' କହିଲେ କଣ ବୁଝ ?

(ଞ) 'ଆତ୍ମତତ୍ତ୍ୱ ଚର୍ଯ୍ୟାଚୟ' ଗ୍ରନ୍ଥର ଲେଖକ କିଏ ?

(ଟ) ଭାଗବତ ଭାଷାକୁ 'ପ୍ରାମାଣିକ ଓଡ଼ିଆ' କହିବାର ତାତ୍ପର୍ଯ୍ୟ କଣ ?

(ଠ) ଉପାସ, ଜନମେଜସ, ବିଜସ (ୟ>ଏ) ଇତ୍ୟାଦି ଶବ୍ଦ କେଉଁ ପ୍ରାଚୀନ ଗ୍ରନ୍ଥରେ ଦେଖିବାକୁ ମିଳେ ?

(P.T.O...)

ଖ- ବିଭାଗ

୨. ଷୋଡ଼ଶ ଶତାବ୍ଦୀ ପର୍ଯ୍ୟନ୍ତ ଓଡ଼ିଆ ଭାଷାର ବିକାଶକ୍ରମ ଦର୍ଶାଅ । (୧୨)

ଅଥବା

ଇଣ୍ଡୋୟୁରୋପୀୟ ଭାଷା ପରିବାରରୁ କେଉଁ ସବୁ ପର୍ଯ୍ୟାୟ ଦେଇ ଓଡ଼ିଆ ଭାଷା ଉତ୍ପତ୍ତି ଲାଭ କରିଛି । ସବିଶେଷ ଚର୍ଚ୍ଚାକର ।

୩. ଓଡ଼ିଆ ଲିପିର ବିବର୍ତ୍ତନ ବର୍ଣ୍ଣନା କର । (୧୨)

ଅଥବା

ଓଡ଼ିଆ ଲିପିର ବୈଶିଷ୍ଟ୍ୟ ପ୍ରତିପାଦନ କର ।

୪. ଶିଳାଲେଖ ଗୁଡ଼ିକରୁ ଓଡ଼ିଆ ଭାଷାର ସରୁପ ଉଦ୍‌ଘାଟନ କର । (୧୨)

ଅଥବା

ଓଡ଼ିଆ ଭାଷା ବିକାଶରେ କପିଳେନ୍ଦ୍ର ଦେବଙ୍କ ଦ୍ଵାରା ଖୋଦିତ ଶିଳାଲେଖ ଗୁଡ଼ିକର ବିଶେଷତ୍ଵ ଆଲୋଚନା କର ।

୫. ଚର୍ଯ୍ୟାଗାତିକାର ଭାଷା ବିଭବ ବିଶ୍ଳେଷଣ କର । (୧୨)

ଅଥବା

ସାରଳା ମହାଭାରତର ଭାଷାତାତ୍ତ୍ଵିକ ସରୁପ ନିର୍ଣ୍ଣୟ କର ।

୬. ଜଗନ୍ନାଥ ଦାସ ହିଁ ପ୍ରାମାଣିକ ଓଡ଼ିଆ ଭାଷାର ପ୍ରତିଷ୍ଠାତା - ଏହାର ସତ୍ୟତା ପ୍ରମାଣ କର । (୧୨)

ଅଥବା

ପ୍ରାଚୀନ ଓଡ଼ିଆ ଗଦ୍ୟ ଭାଷା ବିକାଶରେ 'ମାଦଳାପାଞ୍ଜିର' ସ୍ଥାନ ନିରୂପଣ କର ।

+3, 3rd SEMESTER EXAMINATION-2018
(ARTS)

Sub: HISTORY

Full Marks: 80

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

SECTION-A (Compulsory)

[2x8]

1. Answer any EIGHT of the following.

- (a) Who was Abdul Razzaque and when came to India as a traveller?
- (b) Who wrote the famous book "Pruthyraj Raso" and about which king he had described.
- (c) In the early Medieval age which Rajput state were powerful?
- (d) Who was the founder of the Rastrakuta Dynasty and who was the famous king of the dynasty?
- (e) Who was the founder of Pal dynasty in Bengal and what was his period?
- (f) When the Arabian Invaded India and occupied sindh province. Who was the commander in chief?
- (g) Mahammad Ghori when conquered India and belong to which state?
- (h) Which Muslim settled India as permanently and who was the founder of the slave dynasty?
- (i) When the system of fullim started in India ns what was the position of land lords.
- (j) Describe the jain culture in Odisha.

(P.T.O...)

[2]

(k) Who has written Utteramacharita and Kadambini?

SECTION-B

Answer any FOUR of the followings.

[16x4]

2. Give an account of the rise of Rajput States.
3. Give an account of Mahammad of Ghur's India invention and occupation.
4. What do you know about agriculture expansion and the development of irrigation during early mediaeval age.
5. Describe the process of urbanization in early Mediaeval India.
6. Describe the sea route trade in Medieaval age.
7. Describe the development of Bhakti movement in south India and who the main propagators were.
8. Describe the development of Medieaval age or sultanate period.

- x - x - x -

**+3, 1st SEMESTER END EXAMINATION-2018
(ARTS)**

Sub.- HINDI

PAPER : Core - V

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.

विभाग - क

[2 x 8

1. निम्नलिखित प्रश्नों में से किन्हीं आठ प्रश्नों का संक्षिप्त उत्तर दीजिए।
- क) 'स्रोत भाषा' एवं 'लक्ष्य भाषा' किसे कहते हैं?
 - ख) सफल अनुवादक के दो विशेष गुणों को लिखिए।
 - ग) सरकारी पत्रों का अनुवाद किस प्रकार का अनुवाद कहा जाता है?
 - घ) अनुवाद कितने प्रकार के हैं?
 - ङ) 'कार्यालयी अनुवाद' कहने से आप क्या समझते हैं?
 - च) 'समतुल्यता सिद्धांत' को अनुवाद का प्राण क्यों कहा जाता है?
 - छ) सारानुवाद का एक उदाहरण दीजिए।
 - ज) भावानुवाद और कार्यालयी अनुवाद में क्या अंतर होता है?
 - झ) अनुवाद के लिए अंग्रेजी का कौन सा शब्द प्रयुक्त होता है वह प्राचीन फ्रांसीसी भाषा के किस शब्द से निकला है?
 - ञ) हिन्दी के किसी एक उपन्यास का नाम लिखिए जिसका अनुवाद ओड़िया में हुआ है?

विभाग - ख

[16 x 4

निम्नलिखित प्रश्नों में से किन्हीं चार प्रश्नों का उत्तर दीजिए।

2. अनुवाद को परिभाषित करते हुए विद्वानों के द्वारा दिये गए मतों की परीक्षा कीजिए।
3. अनुवाद के स्वरूप पर प्रकाश डालते हुए तर्क सहित सिद्ध कीजिए कि अनुवाद कला है अथवा विज्ञान।
4. अनुवाद प्रक्रिया में अनुवादक को किन किन विषयों पर ध्यान देना आवश्यक है? एक सफल अनुवाद के लक्षणों को उल्लेख कीजिए।
5. साहित्यिक अनुवाद की विशेषताओं को उल्लेख कीजिए।
6. अनुवाद में समतुल्यता के सिद्धान्त क्या है सविस्तार उत्तर दीजिए।
7. अनुवाद का क्षेत्र अत्यंत व्यापक है, इस दृष्टि से अनुवाद के क्षेत्र पर प्रकाश डालिए।
8. कार्यालयी अनुवाद, सारानुवाद एवं भावानुवाद पर प्रकाश डालिए।



**+3, 3rd SEMESTER EXAMINATION-2018
(ARTS)**

Sub: EDUCATION

Full Marks: 60

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

GROUP-A

1. Answer any SIX of the following questions.

[2x6]

- (i) Write one of the basic differences in use of hardware and software technology.
- (ii) Write one of the contents of teaching technology.
- (iii) State any two limitations of Flander's interaction analysis.
- (iv) What is principles of small step in programmed instruction?
- (v) Which innovative educational technology insists on reduction of size of class, content and time of teaching?
- (vi) Who were the exponents of synetics model of teaching?
- (vii) Give any two example of graphic teaching aids.
- (viii) Give an example of software based teaching aids.

GROUP-B

Answer any FOUR long type questions given below.

- 2. Explain the concepts of educational technology. How it helps in class room teaching?**

[4+8]

OR

(P.T.O...)

[2]

Describe the system analysis approach to educational technology. Bring out its merits and demerits. [8+4]

3. Elucidate the meaning and nature of communication. Explain the process and components of communication. [4+4+4]

OR

Explain the process and types of communication and enlist the barriers of communication with examples. [8+4]

4. Describe personalised system of instruction in respect of its concept, objectives, strategies and application. [4+4+4]

OR

Define micro teaching. Explain its nature, phases and advantages. [4+4+4]

5. Explain the memory model of teaching in respect to its focus and syntax with reference to herbartian steps. [6+6]

OR

Describe the Bruner's concept attainment model with the steps in the teaching of concept. [12]

6. Discuss different types of projected and non projected teaching aids along with its utility and limitation. [6+6]

OR

What do you mean by teaching aids? Discuss the selection, collection, preparation and uses of four type of teaching aids for teaching a subject of your choice. [12]

+3, 3rd SEMESTER EXAMINATION-2018

(ARTS)

ENGLISH (Hons: C-V)

Time: 3 Hours

Full Marks: 80

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

1. Answer any EIGHT of the following:

[2x8]

- (i) What is Romanticism?
- (ii) How is British Romantic literature related to French Revolution?
- (iii) What is "The Cotter's Saturday Night" about?
- (iv) Why is Blake called a Romantic poet?
- (v) Define ode. What are its features?
- (vi) What is the theme of "Ode: Intimations of Immortality"?
- (vii) State the theme of "Ode on Melancholy".
- (viii) Why does Shelley address the West Wind as 'wild'?
- (ix) Why does Wordsworth write "Preface" to the *Lyrical Ballads*?
- (x) What is Shelley's "A Defense of Poetry" about?

Answer any FOUR of the following.

[16 x 4]

2. Highlight Burn's main concerns in "To a Mouse".
3. Critically appreciate "London".
4. Show Coleridge's interest in the supernatural in "Kubla Khan".

(P.T.O...)

5. Analyze Wordsworth's approach to Nature in "Tintern Abbey".
6. Critically appreciate "Ode on a Grecian Urn".
7. What does Wordsworth say about "a Poet"? Discuss.
8. Answer any four of the following:

(a) Annotate the extract:

I'm truly sorry Man's dominion
Has broken Nature's social union.

(b) Annotate the extract:

O joy! that in our embers
Is something that doth live
That nature yet remembers
What was so fugitive!

(c) Annotate the extract:

"Beauty is truth, truth beauty, - that is all
Ye know on earth, and all ye need to know".

(d) Why does Shelley write "If Winter comes, can Spring be far behind"?

(e) What does Wordsworth say about style in "Preface" to *Lyrical Ballads*?

(f) What does Wordsworth say about the language of poetry and the language of prose in "Preface" to *Lyrical Ballads*?

**+3, 3rd SEMESTER EXAMINATION-2018
(SCIENCE)**

Sub: BOTANY
Paper: CORE-V

Full Marks: 60
Time: 3 Hours

*Answer the questions as per instruction.
The figure in the right hand margin indicate marks.*

GROUP - A

1. Write short notes on any SIX of the following. Each [2x6]
in 3 to 5 sentences.
- (a) Palm odesmata
 - (b) Wall ingrowths
 - (c) Histogen theory
 - (d) Heart wood
 - (e) Lithocysts
 - (f) Tyloses
 - (g) Stomata
 - (h) Hadrocertric Vascular bourdle.

GROUP-B

Answer any FOUR questions.

- 2. Discuss the process of Cyto-differentiation of [12]
tracheary elements.
- 3. Write a brief note an vaascular tissue system and types [12]
of vascular boundles found in angiosperms.
- 4. Narrate the process of secondary growth in dicot stem. [12]
Discuss how it is affected by seasonal changes.

[2]

5. Discuss the anatomic adaptations found in Xerophytes and hydrophytes. [12]
6. What are secretory tissues? Give a brief note on secretory tissues found in angiosperms. [12]
7. Write short notes on : [6x2]
 - (a) Ergastic Substances
 - (b) Origin of lateral roots
8. Write short notes on: [6x2]
 - (a) Trichomes
 - (b) Dendrochronology

- x - x - x -

**+3, 3rd SEMESTER EXAMINATION-2018
(SCIENCE)**

Sub: ZOOLOGY

Full Marks: 60

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

Draw labelled diagram wherever required.

GROUP - A

[2x6]

1. Answer any SIX of the following within two sentences.

- (i) Name the Larval form of Balanoglossus.
- (ii) What is retrogressive metamorphosis?
- (iii) Name the types of tails found in fishes.
- (iv) Mention two advanced features of vertebrates over protochordates.
- (v) What do you mean by connecting link?
- (vi) Mention the dental formula of man and monkey.
- (vii) What is the composition of synsacrum?
- (viii) Which reptilian subclass does not have temporal openings? Give one example of this.

GROUP-B

Answer any FOUR of the following.

[12x4]

2. Discuss the concepts and theories of origin of chordates.
3. Write notes on any **two** of the following.
 - (a) Ascidian tadpole larva
 - (b) Hemichordate
 - (c) Types of scales in fishes

(P.T.O...)

[2]

4. Describe the structural peculiarities of petromyzon. Mention its affinities with other animal groups.
5. Give an account of parental care in amphibians.
6. What is migration? Discuss it with respect to birds.
7. Give an account of dentition in mammals.
8. Write notes on any two of the following:
 - (a) Archaeopteryx
 - (b) Skills in Reptilia
 - (c) Organs of Osmoregulation in fishes.

- x - x - x -

**+3, 3rd SEMESTER END EXAMINATION-2018
(SCIENCE)**

**Sub.- COMPUTER SCIENCE
PAPER : Core-V**

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.

Section - 'A'

[2 x 6

1. Answer any SIX of the following.
- Differentiate process and thread.
 - What do you mean by thrashing?
 - Define monitor. What does it consist of ?
 - What is internal fragmentation problem? How it is solved?
 - Differentiate page and frame.
 - Define atomic transaction.
 - What do you mean by CPU-I/O Burst Cycle ?
 - Define the threats which lead to File Protection.

Section - 'B'

2. a) Briefly describe about different types of Operating systems. [6
- b) Explain Operating system architecture briefly. [6
3. a) Discuss about multithreading models and its requirements. Also list out the threading issues. [6
- b) Define Thread State its types. Discuss about the life cycle of a thread. [6

4. a) Differentiate primitive and non-primitive scheduling by giving an example using any of the scheduling algorithms. [6
- b) Describe critical section problem. Discuss Peterson's solution. [6
5. a) Why deadlock occurs? Discuss about the methods used to handle deadlock. [6
- b) Why swapping is needed ? How swapping process is managed by OS? [6
6. a) What do you mean by directory structure? Also discuss different types of directory structures. [6
- b) Discuss the technique used by different page replacement algorithms. [6
7. a) Consider the following process. [6

PROCESS	ARRIVAL TIME	SERVICE TIME
P1	0	7
P2	2	4
P3	4	1
P4	5	4

Solve the above problem with SRTF by drawing Gantt chart and also calculate the average waiting time, turnaround time and throughput.

- b) Explain Process Control Block. Draw the block diagram of process transition states. [6
8. Write short notes (any THREE) [3 x4
- a) Semaphore
- b) Demand paging
- c) Distributed systems
- d) Hardware synchronisation

+3, 3rd SEMESTER EXAMINATION-2018
(SCIENCE)

Sub: CHEMISTRY

Full Marks: 60

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

Group -A

[2x6]

1. Answer any SIX questions.

- (a) What is difference between minerals and ores?
- (b) Predict the feasibility of the following reactions with reasons.
- (i) $\text{CH}_3\text{HgOH} + \text{HSO}_3 \longrightarrow$
- (ii) $\text{CH}_3\text{HgOH} + \text{HF} \longrightarrow$
- (c) Explain why alkali metals are good reducing agents.
- (d) Explain why $\text{B}(\text{OH})_3$ show acidic property
- (e) Write the structure of sulphur trioxide.
- (f) What is the hybridisation and shape of BrF_5 molecule?
- (g) Why most noble gas compounds involves only fluorine and oxygen?
- (h) Define glass transition temperature.

GROUP - B

[12x4]

Answer any FOUR questions.

2. (a) Explain the following technique for refining of metals. [4x2]
- (i) Parting process (ii) Electro refining
- (b) Write notes on Hydro metallurgy [4]

(P.T.O...)

[2]

- 3 (a) Describe the characteristics of hard acids and soft acids. [4+4]
- (b) Give Lewis definition of acid and bases giving suitable examples. [4]
4. (a) Why do lithium and magnesium resemble in their properties? Explain minimum six properties of lithium which resemble with magnesium. [8]
- (b) Discuss about complex compound of Beryllium. [4]
5. (a) What are different types of borates? Explain giving their structure. [8]
- (b) BF_3 exists but BH_3 does not exist. Assign reason. [4]
6. (a) Describe any two methods of preparation and structure of nitric oxide. What happens when nitric oxide reacts with oxygen and chlorine? [3+4+3]
- (b) Why borazine is called inorganic benzene? Explain with reasons. [2]
7. (a) Write any two methods of preparation and discuss the structure of XeF_2 . [8]
- (b) What happens when XeF_6 reacts with water and silicon dioxide? [4]
8. Describe about phosphorous based network polymers. [12]

- x - x - x -

8. Any FOUR.
- Define Learning curve.
 - Write down the difference between C.P.M. and P.E.R.T.
 - Write the standard form of L.P.P.
 - Write down advantages and drawback of WERT.
 - Define block variable, Artificial variable, surplus variable in L.P.P.

[16]

No. of Pages: 4

GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(COMMERCE)

Sub.- Business Mathematics
PAPER : Core - V

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 EIGHT of the following. [2 x 8]
- What do you understand by limit of a function?
 - If A is a square Matrix satisfying $A^T \cdot A = I$, Write the value of $|A|$.
 - If the matrix $\begin{bmatrix} 5x & 2 \\ -10 & 1 \end{bmatrix}$ is singular . Find the value of x .
 - Find $\frac{dy}{dx}$ as $x = at^2$ and $y = 2 at$.
 - Evaluate $\int 1 dx$.
 - Define "Degeneracy" in L.P.P.
 - Define "Unboundedness" in L.P.P.
 - Define "Back wordpass" in Network Analysis.
 - What do you mean by "Pessimistic Time"
 - Explain the meaning of "Crashing" in Network Techniques.

[2]

2. a) Find the adjoint of the Matrix. [8

$$\begin{bmatrix} 1 & 1 & -1 \\ 2 & -1 & 2 \\ 1 & 3 & -2 \end{bmatrix}$$

b) Solve by Matrix method [8

$$x - y + z = 4$$

$$2x + y - 3z = 0$$

$$x + y + z = 2.$$

3. a) Find derivative of [8

$$y = \left(1 + \frac{1}{x}\right)^x \text{ w.r.t. } x.$$

b) Test differentiability of the function $\left|1 - \frac{1}{x}\right|_{x=1}$. [84. a) Evaluate $\int x^2 e^{ax} dx$. [8b) Evaluate $\int_0^1 x^7 (1+x^8)^{\frac{1}{3}} dx$ [85. a) Evaluate $\int (1+x)e^x dx$. [8

b) Discuss the different types of annuities with examples. [8

6. a) The value of a machine depreciates at 10% p.a if the present value is Rs. 40,000. Find its value 3 years ago. [8

[3]

b) Find the maximum value of z by using Graphical method. [8

$$Z_{max} = 7x_1 + 10x_2$$

Subject to

$$x_1 + x_2 \leq 30,000$$

$$x_2 \leq 12,000$$

$$x_1 \geq 6,000$$

$$x_1 \geq x_2$$

$$\therefore x_1, x_2 \geq 0$$

7. a) Solve by Simplex method [8

$$Max \ z = 5x_1 + 7x_2$$

Subject to

$$2x_1 + 3x_2 \leq 13$$

$$3x_1 + 2x_2 \leq 12$$

$$x_1, x_2 \geq 0$$

b) The following table shows the job of network alongwith their time estimates. [8

Job	1-2	1-6	2-3	2-4	3-5	4-5	5-8	6-7	7-8
a	3	2	6	2	5	3	1	3	4
m	6	5	12	5	11	6	4	9	19
b	15	14	30	8	17	15	7	27	28

i) Draw the project Network

ii) Find the critical path

No. of Pages: 3

GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(ARTS)

Sub.- Economics
PAPER : C - V

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.

1. Answer any EIGHT of the following. [2x8]
- Define consumer surplus.
 - What the consumer must do inorder to stay on the same convex indifference curve?
 - Gain in utility due to increased consumption of a goods is equal to what?
 - What does the substitution effect of a change in the price of bananas reffer to?
 - If demand is unit elastic, what effect a price reduction will have un revenue?
 - In what way MRTS behave incase of a Neutral Technical progress?
 - What gives the size of the production function in CES production function?
 - What does Economics of Scope refer to?
 - What does a firm choose to maximise profit?
 - What do you mean by marginal revenue product of an input?

[P.T.O.]

[2]

Answer any FOUR questions.

2. a) Is it possible for marginal utility to be negative while total utility is positive? If yes, under what circumstances it is possible? [10
- b)i) What does consumer surplus measure? [3+3
- ii) Along a consumer's demand curve, what does price reflect?
3. a) "A budget line is nothing but demand curve of the consumer expressed in terms of two goods given the money income and price of these two commodities". Explain [10
- b)i) "Choice reveals preferences" Do you agree? Why? [3+3
- ii) What are the features of indifference curve?
4. (a) Explain how the law of demand affects market activity? [10
- (b)i) What determines the quantity of a good that buyers demand? [3+3
- ii) Distinguish between substitutes and complements.
5. (a) What do you mean by Technological progress? Discuss the different types of Technical progress as envisaged by Hicks. [10
- (b) i) Why the MRTS diminishes as we move down an iso quant for most production functions. [3+3
- ii) Can an iso -quant be concave to the origin?

[3]

6. (a) State and explain the law of returns to scale. [10
- (b) i) What are the basic assumptions behind the law of variable proportions? [3+3
- ii) Why it is not possible for a producer to obtain equilibrium with only iso quants?
7. a) Can cost functions be derived graphically from production functions? Explain. [10
- b)i) What is the relevance of the distinction between short run and long run to the cost analysis? [3+3
- ii) Why does the shape of the long run average cost curve (LAC) matter?
8. a) Mathematically derive the necessary and sufficient conditions for profit maximisation. [10
- b)i) Why a firm's marginal cost curve is its supply curve? [3+3
- ii) What are the properties of profit functions.

■■■

**+3, 3rd SEMESTER EXAMINATION-2018
(ARTS)**

Sub: PSYCHOLOGY

Full Marks: 60

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

GROUP-A (Compulsory)

[2x6]

1. Answer any SIX short questions from the following selecting one of the alternatives given in each.

- (a) Parameter is a property of _____.
(i) Sample (ii) Group (iii) Crowd (iv) Population
- (b) Mention which scale has true zero point.
(i) Ratio (ii) Ordinal (iii) Nominal (iv) Interval
- (c) The value in a series of observations which occurs with highest frequency is _____.
(i) Mean (ii) Mode (iii) Median (iv) SD
- (d) The most stable index of variability is called as _____.
(i) Range (ii) Quartile deviation
(iii) Average deviation (iv) Standard deviation
- (e) The one half of the scale distance between the 75th and 25th percentiles in a frequency distribution is termed as _____.
(i) Average deviation (ii) Quartile deviation
(iii) Standard deviation (iv) Range

[2]

(f) The statistics that describes the degree of relationship between two variables is called as _____.

(i) 't' value (ii) 'z' value

(iii) Correlation coefficient (iv) Parameter

(g) when we reject the null hypothesis by making a difference significant although no true difference exists is called _____.

(i) One tailed test (ii) Alternative hypothesis

(iii) Type-I error (iv) Type-II error.

(h) When on two groups, we compute 't' test and 'f' test. Mention the relationship between 't' and 'f' values.

(i) 't' value is equal to F value.

(ii) 't' value is twice the F value.

(iii) Value of 't'² is equa; to F.

(iv) 't' value is half of 'F' value.

GROUP-B

Answer any FOUR of the long type questions given below.

2. Explain different scales of measurement used in psychological statistics with suitable examples. [12]

3. Compute the mean and median of the following distribution of scores. [12]

Scores	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	
Frequency	1	2	3	4	5	6	7	8	9	N=50

4. Calculate the SD and quartile deviation for the frequency distribution given below. [12]

Scores	5-10	10-15	15-20	20-25	25-30	30-35	35-40	
Frequency	2	6	12	20	10	6	4	N=60

[3]

5. Discuss the general features of normal probability curve (NPC) [12]

6. Write short notes on: [6x2]

(a) Levels of significance

(b) Type-I and type II errors

7. (a) State the assumptions of Mann-whitney 'U' test. [6x2]

(b) Write the assumptions of Chi-Square test.

8. Apply Kruskal-wallis test to the following data for four groups and interpret the result [12]

Group-I: 5 7 16 14 19

Group-II: 8 15 18 20 24

Group-III: 17 21 22 25 29

Group-IV: 23 27 28 31 32

- x - x - x -

**+3, 3rd SEMESTER EXAMINATION-2018
(SCIENCE)**

Sub: STATISTICS

Full Marks: 60

Paper: CORE-V

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

GROUP - A

1. Answer all the questions.

[1x10]

- (a) Differentiate Binomial distribution with Bernoulli distribution.
- (b) Mention two properties of Poisson distribution.
- (c) Write the area properties of a normal variate.
- (d) Define beta distribution of first kind.
- (e) If Y is a standard normal variate, define Chi-square variates with 1 and also $n.d.f.$
- (f) If all the odd order moments about origin of an exact sampling distribution are zero write the $p.d.f.$ of that distribution.
- (g) What does WLLN imply?
- (h) Write the Poisson's WLLNs.
- (i) What does the central limit theorem indicates?
- (j) How SLLN differs from WLLN?

GROUP-B

Answer all the questions.

[10x5]

2. (a) Define Binomial Distribution. Write the probability function of Hyper-geometric distribution. Obtain mean and variance of Hyper-geometric distribution.

(P.T.O...)

[2]

OR

- (b) If X is a Poisson variate such that $P(X=2) = 9(P(X=4) + 90P(X=6))$, find β_1
- (c) Define Binomial distribution. Note down all the properties of Binomial distribution with applications.
3. (a) Subway trains on a certain line run every half hour between mi-night and six in the morning. What is the probability that a man entering the station at random time during this period will have to wait all least twenty minutes?
- (b) Let X is a standard Cauchy distribution. Find *p.d.f.* for X^2 and identify its distribution.

OR

- (c) If X and Y exponential variates and are independent with common probability $f(x) = e^{-x}, x > 0$ and 0 for $x \leq 0$. Find the *p.d.f.* for $X - Y$.
4. Define Chi-Square distribution with n *d.f.*. Derive its *p.d.f.*. Show that mean of the distribution is n .

OR

Obtain the even order moments about mean of t distribution. Find β_1 and β_2 .

5. Derive Chebychev's inequality and show how it leads to Weak Law of Large Numbers (WLLN). Mention some important particular cases wherein the WLLN hold good.

OR

[3]

A random variable X takes values $-1, 1, 3$ and 5 with associated probabilities $\frac{1}{6}, \frac{1}{6}, \frac{1}{6}$ and $\frac{1}{2}$. Find by direct computation $P(|X - 3| \geq 1)$. Find an upper bound to this probability using Chebychev's inequality.

6. Mentioning the assumptions state and prove Linderberg-Levy theorem.

OR

if X_1, X_2, \dots be i.i.d. Poisson variates with parameter λ . Using central limit theorem estimate

$P(120 \leq S_n \leq 160)$ where $S_n = \sum_{i=1}^n X_i; \lambda = 2$ and $n = 75$

- x - x - x -

GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(SCIENCE)

Sub.- Real Analysis (MTC)

PAPER : Core - V

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.

1. Answer any EIGHT of the following.

[2x8]

a) Find the limit point of the sequence

$$\{a_n\} = \left\{ \frac{zn^2 - 3n}{n^2 + 1} \mid n \in \mathbb{N} \right\}$$

b) Prove that $\lim_{n \rightarrow \infty} \frac{3 + 2\sqrt{n}}{\sqrt{n}} = 2$

c) State Cauchy's general principles of convergence.

d) Prove that $f(x) = |x - 2|$ is not derivable at $x=2$.

e) Prove that $\tan x > x$ for $x \in (0, \pi/2)$.

f) State Darboux's theorem.

g) Derive Maclaurin's series of $f(x)$ from Taylor's series.

h) Write down the Maclaurin's series of e^{2x} .

i) Evaluate $\lim_{x \rightarrow 0} \frac{1 - \cos 3x}{x^2} = ?$

j) Evaluate $\lim_{x \rightarrow 0} (\sin x \cdot \log x) = ?$

[P.T.O.]

[2]

2. a) Evaluate the following limits

$$i) \lim_{n \rightarrow \infty} \frac{(3n+1)(n-2)}{n(n+3)} \quad [4]$$

$$ii) \lim_{n \rightarrow \infty} [\sqrt{n+1} - \sqrt{n}] \quad [4]$$

b) Prove that the sequence $\{b_n\}$, where [8]

$$b_n = \left\{ \frac{1}{\sqrt{n+1}} + \frac{1}{\sqrt{n+2}} + \dots + \frac{1}{\sqrt{2n}} \right\} \text{ diverges to } \infty.$$

3. a) Test the continuity of the function

$$f(x) \begin{cases} e^{1/x} - e^{-1/x} & , \text{ when } x \neq 0 \\ e^{1/x} + e^{-1/x} & , \text{ when } x = 0 \end{cases} \quad [8]$$

b) Prove that if a function f is continuous on a closed interval $[a, b]$, then it attains its bounds at least once in $[a, b]$. [8]

4. a) State and prove Lagrange's mean value theorem.

b) Apply Rolle's theorem to prove between any two real roots of $e^x \sin x = 1$, there is at least one real root of $e^x \cos x + 1 = 0$.5. a) Find the range of values of x for which [8]

$$f(x) = x^3 - 6x^2 - 36x + 7 \text{ increases with } x.$$

b) Use Taylor's theorem to prove that [8]

$$\cos x \geq 1 - \frac{x^2}{2} \text{ for all real } x.$$

[3]

6. a) Use Maclaurin's expansion to prove [8]

$$e^x \cos x = 1 + x - \frac{2x^3}{3!} - \frac{2^2 x^4}{4!} - \frac{2^2 x^5}{5!} + \dots$$

b) Examine the validity of Lagrange's mean value theorem for $f(x) = 2x^2 - 7x + 10$, $x \in [2, 5]$. [8]

7. a) Find the Taylor's series expansion of [8]

$$f(n) = \ln(a+bx) \text{ about } x=1.$$

b) Examine the function $(x+2)^3(x-3)^4$ for extrem values. [8]8. a) Prove that $\frac{\sin \alpha - \sin \beta}{\cos \beta - \cos \alpha} = \cot \theta$ [8]

$$\text{where } 0 < \alpha < \theta < \beta < \pi/2.$$

b) Establish Taylor's theorem with Lagrange's form of remainder. [8]



GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- MATH
PAPER : C - V

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.

1. Answer any EIGHT of the following.

[2x8]

- a) Evaluate $\lim_{n \rightarrow \infty} [\sqrt{n+1} - \sqrt{n}]$
- b) Define Cauchy sequence with example.
- c) State the relation between continuous and differentiable function.
- d) State Lagrange's mean value theorem.
- e) Evaluate $\lim_{x \rightarrow 0} \frac{2x - \sin x}{x^2}$
- f) Examine the validity of Rolle's theorem on
 $f(x) = |x-1|x$ for $x \in [0, 1]$
- g) Define saddle point of a function.
- h) Write down the Maclaurin's series of $f(x)$.
- i) State Taylor's theorem with Cauchy's form of remainder.
- j) Write down the Maclaurin's series for $f(x) = e^{2x}$.

[6x2]

2. a) State and prove Bolzano -weierstrass theorem for sequence. [8

b) Prove that the sequence $\{b_n\}$ where [8

$$b_n = \left\{ \frac{1}{\sqrt{n^2+1}} + \frac{1}{\sqrt{n^2+2}} + \dots + \frac{1}{\sqrt{n^2+n}} \right\}$$

converges to 1.

3. a) State and prove intermediate value theorem. [8

b) Prove that $f(x) = x^2$ is not uniformly continuous on $[0, \infty)$ [8

4. a) Prove that $\frac{x}{1+x} < \log(1+x) < x, \forall x > 0$

b) Find the range of values of x for which the function $x^3 - 6x^2 - 36x + 7$, increases with x . [6x2]

5. a) Evaluate $\lim_{x \rightarrow 0} \frac{xe^x - \log(1+x)}{x^2}$

b) Use Taylor's theorem to prove

$$x - \frac{x^3}{3!} < \sin x < x - \frac{x^3}{6} + \frac{x^5}{120} \quad [6x2]$$

6. a) Using Maclaurin's expansion prove that

$$\log \sec x = \frac{x^2}{2} + \frac{x^4}{12} + \dots \quad [6x2]$$

b) Test the differentiability of [6x2]

$$f(x) = \begin{cases} x^2 - 2 & 2 \leq x < 3 \\ 2x + 1 & 3 \leq x < 4 \end{cases} \quad \text{at 2 and 3.}$$

7. a) Prove that $x < \sin^{-1}x < \frac{x}{\sqrt{1-x^2}}, 0 < x < 1$ [8

b) Apply Lagrange's mean value theorem to the function $\log(1+x)$ to prove that [8

$$0 < [\log(1+x)]^{-1} - x^{-1} < 1, \forall x \geq 0$$

8. Prove that

(a) $\frac{v-u}{1+v^2} < \tan^{-1}v - \tan^{-1}u < \frac{v-u}{1+u^2}$, if $0 < u < v$. [8

(b) Find the Maclaurin's expansion of $f(x) = x \cos x$ [8



No. of Pages: 3

GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- Physics
PAPER : Core-V

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.

Group - A

[2x6]

1. Answer any SIX of the following.
 - a) Define periodic function and its period.
 - b) How can you expand a non periodic function over an interval.
 - c) Define Euler's integral form of $\Gamma(n)$
 - d) What do you mean by half range Fourier sine series?
 - e) Write down complex notation for fourier series of $f(x)$.
 - f) Discuss the singular points of Hermite differential equation.
 - g) What are spherical harmonics $Y_{lm}(\theta, \phi)$?
Find $Y_{0,0}(\theta, \phi)$.
 - h) How can you expand a function $f(x)$ in terms of Legendre polynomials.

[P.T.O.]

Group - B

Answer any **FOUR** of the following.

2. a) State and prove Parseval's Identity. [6]
 b) Find Fourier series for $f(x) = x^2$ in the interval $0 < x \leq 2$. [3]
 c) Using integration find also the Fourier series for x^3 in the same interval. [3]
3. a) Show that the recurrence relation $\Gamma(n+1) = n\Gamma(n)$ [3]
 b) Prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$ [3]
 c) Verify the relation $\beta(a, b) = \beta(a+1, b) + \beta(a, b+1)$ [3]
4. a) Obtain Rodrigue formula [6]

$$H_n(x) = (-1)^n e^{x^2} \frac{d^n}{dx^n} (e^{-x^2})$$

 b) Starting from recursion relation for $H_n(x)$ show that $H_n''(x) - 2x H_n'(x) + 2n H_n(x) = 0$. [6]
5. a) Show that $P_l^{-m}(x) = (-1)^m \frac{(l-m)!}{(l+m)!} P_l^m(x)$ [6]
 b) The expansion coefficient of $f(x)$ in terms of $P_n(x)$ is given by $A_n = \frac{2n+1}{2} \int_{-1}^1 P_n(x) f(x) dx$. [6]
 find A_0, A_2 , and A_3 .

6. Obtain differential equation for vibrational modes of a stretched string. Obtain its solution by separable variable method. [4+8]
7. Write down Laplace equation for potential function in spherical polar co-ordinates. Obtain its solution for azimuthal symmetry. [4+8]
8. a) Differentiate systematic and Random error. [4]
 b) Write short notes on standard and probable Error. [4+4]



GACR
+3, 3rd SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- ETC
PAPER : C - V

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. [2x6]
- a) Write the linear properties of fourier transformation.
 - b) Find the Laplace transformation of $e^{-3t} \cdot 2 \cos 5t$.
 - c) Difine grad f , where f is a vector function.
 - d) State Green theorem.
 - e) State Cauchy-Integral theorem.
 - f) What do you mean by Eigen value of a matrix.
 - g) Express the matix $A = \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix}$ in terms of symmetric and skew symmetric Matrix.
 - h) Write the Addition rules of probabilities .
- Answer any FOUR questions.
2. a) Solve by the method of Laplace transformation, the equation [6x2]
- $$y''' + 2y'' - y' - 2y = 0, \text{ given}$$
- $$y(0) = y'(0) = 0, \quad y''(0) = 6.$$

[P.T.O.]

- 2 b) Express $f(x) = 1$ for $0 \leq x \leq \Pi$
 $= 0$ for $x > \Pi$
 as Fourier sine integral and hence evaluate.

$$\int_0^{\infty} \frac{1 - \cos(\Pi\lambda)}{\lambda} \sin(x\lambda) d\lambda.$$

3. If $u = x + y + z, v = x^2 + y^2 + z^2, w = yz + zx + xy$ [12]
 prove that grad u , grad v and grade w are co-planner.

4. If $F = 3xy \mathbf{i} - y^2 \mathbf{j}$ [12]
 Evaluate $\int_C F \cdot dR$. where C is the curve in the xy -
 plane $y = 2x^2$ from $(0, 0)$ to $(1, 2)$

5. a) Show that $f(z) = \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, (z \neq 0)$ [6x2]
 is analytic, using cauchy - Roumann Eq.

- b) Evaluate $\int_c \frac{z^2 - z + 1}{z - 1} dz$, where c is a circle $|z| = 1$.

- 6 Find the Eigen value and Eiegen vector of the matrix. [12]

$$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$$

7. a) Find the rank of the matrix [6x2]

$$\begin{bmatrix} 0 & 1 & -3 \\ 1 & 0 & 1 \\ 3 & 1 & 0 \end{bmatrix}$$

[3]

- b) Find Laplace transformation of following
 (i) $L(t \sin at)$ (ii) $L(t \cos at)$

8. a) State Bay's theorem. [2+10]

- b) The Machines M_1, M_2 and M_3 produce idential items. Of their respective output 5%, 4% and 3% are defective. If M_1, M_2 and M_3 produce 25%, 30% and 45% of the total output. An item is selected at random and found to be defective.

What is the probability that it produce by machine M_3 .

