

No. of Pages: 2

GACR

+3, 5th SEMESTER END EXAMINATION-2018

(SCIENCE)

Sub.- BOTANY

PAPER : DSE- II

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 questions. [2 x6]
- Write two uses of statistics in biology.
 - What is frequency?
 - What is primary data?
 - Define random sampling.
 - What is range?
 - What is dispersion?
 - Define central tendency.
 - What is correlation?

Answer any FOUR.

- Discuss some important functions of statistics. [12]
- Write short notes; [6x2]
 - Standard error
 - Geometric mean
- What is data? Explain different types of data. [12]
- What is correlation? Discuss different types of correlation with examples. [12]

P.T.O.

[2]

6. Discuss ungrouped frequency distribution and grouped frequency distribution. [12]
7. What is measures of central tendency? Discuss arithmetic mean with its merits and demerits. [12]
8. What is U test? Discuss its applications in biological experiments. [12]



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GACR

+3, 5th SEMESTER END EXAMINATION-2018

(SCIENCE)

Sub.- ETC

PAPER : DSE- 2

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. [2 x8]
- Distinguish between power and energy signal with the example.
 - What are the elementary discrete time signals.
 - Define and express the transfer function of LTI system.
 - What is a continuous and discrete time signal?
 - Differentiate between even and odd signals.
 - Write the properties of convolution
 - Find the DFT of a sequence $x(n)=\{ 1,1,2,2,\}$.
 - List any two properties of 2 transform.
 - Differentiate between Analog and digital signal.
 - State shifting property of the DFT.

Answer any FOUR.

2. a) Explain the frequency response of discrete time signal. [8]

P.T.O.

- b) Find the periodicity of the signal [8]
 $x(n) = \sin(2\pi n/3) + \cos(\pi n/2)$
3. a) Write the causality condition for an LTI system. [8]
 b) Find the linear convolution of the sequences [8]
 $x[n] = \{1, 4, 0, 9, -1\}$ and $h[n] = \{3, -4, 0, 7\}$
4. a) State and prove any three properties of [8]
 Z-transform.
 b) Explain the properties of Laplace transformation. [8]
5. a) Find the DFT of the sequence [8]
 $x[n] = \{1, 2, 3, 4, 5, 6, 7, 8\}$ [8]
 b) State all properties of DFT. [8]
6. a) Comparison of FIR and IIR filters. [8]
 b) Derive the equation to implement a Butterfly [8]
 diagram in DIF (Decimation-in-frequency) FFT [8]
 algorithm.
7. a) What are the advantages of FFT over DFT [8]
 b) Calculate the percentage of saving in calculations [8]
 in a 1024-point radix-2 FFT when compared [8]
 to direct DFT.
8. Realise the following IIR system functions in the [16]
 direct form I and II and also parallel form.

$$H(z) = \frac{1}{(1-az^{-1})^2} + \frac{-1}{(1-bz^{-1})^2}$$



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GACR
+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- ZOOLOGY
(PAPER : DSE-2)

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. [2 x 6]
- a) What is supersedure ?
 - b) What is chawki rearing
 - c) What is nuptial flight
 - d) What is aquaculture?
 - e) What are the poultry products?
 - f) What is air breathing fish? Give its example.
 - g) Mention four bacterial diseases of fish along with its causative organism.
 - h) Write four economic importance of crab culture.

Answer any FOUR.

[4x12]

Provide diagram where necessary.

2. What is apiculture? Describe methods of bee keeping and its products along with economic importance.
3. a) American and European fowlbrood and their management.
b) Diseases of silkworm.

P.T.O.

4. What is silk? Describe the rearing of *Bombyx mori* and importance of silk.
5. What is induced breeding? Describe induced breeding techniques and its importance.
6. Write short notes on:
 - a) By-products of fishery industry
 - b) Pearl culture.
7. Describe the culture of fresh water prawn.
8. What is Dairy farming? Describe the management of dairy farming.



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GACR

**+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)**

Sub.- CSC

PAPER : DSE - II

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 . [2 x 6]
- What is microcontroller?
 - What is stack pointer?
 - What is ARM processor?
 - What is difference between microprocessor and processor?
 - Write the function of assembler and linker?
 - Explain assembler directives.
 - What is virtual memory?
 - What is programmable peripheral device?

Answer any FOUR.

- Explain Von-Neuman architecture. [6]
 - Describe the architecture of 8085 microprocessor. [6]
- What is an interrupt. Discuss all the five software interrupt instructions. [6]
 - Mention how do the following instructions work after their functionality. [6]

P.T.O.

- i) DIV & IDIV
- ii) CMP & SUB
- 4. a) Explain the architecture of 8086 microprocessor. [6
- b) Explain 8086 interrupts. [6
- 5. a) Explain memory interfacing and address decoder [6
- concepts. [6
- b) Write a program in assembly language to find [6
- largest of n numbers stored in memory. [6
- 6. a) Explain applicaion of microprocessor and micro [6
- controller in traffic control. [6
- b) Explain cascading of multiple PIC 8259. [6
- 7. a) Explain in brief steps to develop a microprocessor [6
- based computer system. [6
- b) Explain interfacing EPROM and RAM memories. [6
- 8. Write short notes on (any TWO): [6 x 2
- i) Features of 8051 micro controller [6 x 2
- ii) 8085 pin functions
- iii) EPROM



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GACR

**+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)**

**Sub.- CHEMISTRY
PAPER : DSE - 2**

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. [2 x 8]
- a) What is Green Chemistry?
 - b) Write two limitations of green chemistry.
 - c) Write Need for Green Chemistry.
 - d) What do you mean by Green solvents?
 - e) What is ultrasonic energy?
 - f) What is Saponification of esters?
 - g) How will you prevent hazardous of toxic products?
 - h) What do you mean by designing of safer chemicals?
 - i) Explain microwave assisted reactions in water like hydrolysis of Benzyl Chloride.
 - j) What is use of 'Clayan'? [16]
2. Explain Twelve principles of Green Chemistry with their explanations and examples.
3. Explain the green synthesis of the following compounds. [16]

P.T.O.

- i) Adipic Acid
 - ii) Paracetamol
 - iii) Furfural
 - iv) 4-amino diphenylamine
4. Explain microwave assisted reactions in organic solvents. ie. [16]
- (i) Esterification
 - ii) Fries rearrangement
 - iii) Diels-Alder reaction [16]
 - iv) Decarboxylation
5. Explain the followings. [16]
- a) Solid - state polymerisation of amorphous polymers using diphenyl carbonate?
 - b) Role of Tellurium in organic syntheses ?
6. Explain the role of Bio-Catelysts in organic syntheses and explain free radical bromination reaction. [16]
7. Explain the followings. [16]
- a) Oxidation reagents and catalyst
 - b) Multi functional reagents.
8. Describe briefly the role of green chemistry in sustainable development and what is Atom economy? [16]



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GACR
+3, 5th SEMESTER END EXAMINATION-2018
(ARTS)
Sub.- ECONOMICS
(PAPER : DSE-2)

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 questions of the following.
- a) What is the barter Economy?
 - b) What is Credit Money? [8 x 2]
 - c) What is near money?
 - d) What are the static functions of money?
 - e) What is supply of money?
 - f) What is demand for money?
 - g) What is Money Market ?
 - h) What is commercial Bank?
 - i) What is Central Bank?
 - j) What is bank rate policy

Answer any 4 questions.

2. Explain critically barter system and its important difficulties. [16]
3. Explain various types of money and their characteristics. [16]

P.T.O.

4. Define money and explain its main functions. [16
5. Explain the cash balance - approach to the problem of the value of money. [16
6. Explain Milton Friednar's theory of demand for money. [16
7. Define financial market and its important constituents. [16
8. Explain briefly important functions of central bank. [16



No. of Pages: 2

GACR
+3, 5th SEMESTER END EXAMINATION-2018
(ARTS)
Sub.- EDUCATION
PAPER : DSE- 2

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'

1. Answer any SIX. questions. Each question carries
Two (02) marks. [2 x 6
- a) State the meaning of special education.
 - b) What is mainstreaming?
 - c) Write 01(one) recommendation of Indian education on exceptional children.
 - d) When was the UN convention on Human Rights held?
 - e) Write any Three characteristics of gifted.
 - f) What is educable mental retardation?
 - g) State any one identification method/procedure for mental retardation.
 - h) State any one role of Resource Teacher for learning disabled children.

P.T.O.

Section 'B'

[4x12

Answer any 4 questions.

2. Explain with examples how the terms impairment, disability and handicap are inter related. [12
3. What is de-institutionalisation? Discuss the process involved in it. [6+6
4. Discuss the views expressed by Rammurti committee(1991) in special education. [12
5. Discuss the programmes to be undertaken for exceptional children as envisaged by the programme of Action (1992). [12
6. Describe the educational provisions and role of the teacher of gifted and creative children. [6+6
7. What measures should be used for educable mentally retarded children? Discuss. [12
8. Briefly discuss the concept and characteristics of educable mentally retarded children. [6+6



+3, 5th SEMESTER EXAMINATION-2018
(ARTS)

Sub: ENGLISH

Full Marks: 80

Paper: DSE-II

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

SECTION-A

[6x5]

Answer all questions.

1. Who coined the term World Literature and when?

OR

What do you mean by World Literature?

2. Is Meursault capable of love in 'The Outsider'?

OR

How does the narrator desire for happiness is exemplified in 'Notes from Underground'?

3. Analyse the character of 'Santosh' in Naipaul's 'In a Free State'.

OR

Analyse the character of unnamed West Indian in "Tell me who to kill" working in London.

4. Write a short note on the character of 'Grant' in. 'The bear came over the mountain'.

OR

What happen to Fiona when Aubrey's wife Marian removes him from the facility to take him home?

5. What does Pablo Neruda meant when he say "Look at all these peace I've been and I still don't get it"

(P.T.O...)

[2]

OR

According to the poet how the things we remember affect us.

SECTION-B

Answer all questions.

[10x5]

1. Why do we need to study world Literature?

OR

What are the uses of World Literature?

2. What are the major themes of 'The Outsider'?

OR

Discuss the main character in "Notes from Underground".

3. Where does the question of diaspora identities come into the play in Naipaul's 'In a Free State'?

OR

Discuss the theme of 'In a Free State'?

4. Analyse "The Bear came over the mountain" by Alice Munro.

OR

How hateship, friendship, courtship, Loveship and marriage play their role in "The Bear came over the mountain."

5. The poet says in 'Death alone, There is no forgetting memories, that we tend not to remember the good times. Do you agree?

OR

Critically appreciate the poem 'Death alone, there is no forgetting memories' by Pablo Naruda.

+3, 5th SEMESTER END EXAMINATION-2018

(ARTS)

Sub.-HINDI

(PAPER :DSE- 2)

Time: 3 Hours

Full Marks : 80

*The figure in the right hand margin indicate marks.
(Answer any Five including Q.-1)*

SECTION - A

1. निम्नलिखित प्रश्नों में से किन्ही **आठ** प्रश्नों के संक्षिप्त उत्तर दीजिए। [2x8]
- प्रेमचन्द का अधूरा उपन्यास क्या है?
 - प्रेमचंद की एक औपन्यासिक विशेषता लिखिए।
 - गंगाराम की मौत कैसे हुई?
 - प्रेमचंद के कुल कितने उपन्यास हैं?
 - तोताराम और निर्मला के असफल दाम्पत्य जीवन का कारण क्या है?
 - धीसु और माधव ने कफन के पैसों का क्या किया?
 - जियाराम और सियाराम कितने साल के थे?
 - 'ईदगार' कहानी का उद्देश्य क्या है?
 - 'निर्मला' उपन्यास में किन किन समस्याओं को उभारा गया है?
 - साहित्य का उद्देश्य क्या है?

SECTION - B

2. निम्नलिखित प्रश्नों में से किन्हीं चार प्रश्नों के संक्षिप्त उत्तर दीजिए। [16 x4]
- निर्मला का चरित्र चित्रण कीजिए।
 - 'अलगयोझा' कहानी में कहनीकार का उद्देश्य स्पष्ट कीजिए।
 - भारतीय स्वतंत्रता आन्दोलन में प्रेमचन्द का योगदान स्पष्ट कीजिए।
 - 'ठाकुर का कुआँ' कहानी में किस समस्या को दिखाया गया है? आलोचना कीजिए।
 - प्रेमचन्द की कहनीकला पर प्रकाश डालीए।
 - प्रेमचन्द युगीय परिस्थितियों पर प्रेमचन्द का क्या प्रभाव पड़ा - विस्तार से लिखिए।
 - राष्ट्रभाषा हिन्दी और उसकी समस्याओं पर चर्चा कीजिए।



GACR
+3, 5th SEMESTER EXAMINATION - 2018
(ARTS)
ODIA (DSE - 2)

Time : 3 Hours

Full Marks : 80

ପ୍ରଥମ ପ୍ରଶ୍ନ ସହିତ ଅନ୍ୟ ଯେକୌଣସି ଚାରିଗୋଟି ପ୍ରଶ୍ନର ଉତ୍ତର ଦିଅ ।

The figure in the right hand margin indicate marks.

(୮×୨)

- e. (ଯେ କୌଣସି ୮ଟି ପ୍ରଶ୍ନର ଉତ୍ତର ଦିଅ)
- (କ) ମାନକ ଭାଷାର ସଂଜ୍ଞା ନିରୂପଣ କର ।
 - (ଖ) ସମ୍ବଲପୁରୀ ଭାଷାର ଧ୍ୱନିଗତ ବୈଶିଷ୍ଟ୍ୟ ଦର୍ଶାଅ ।
 - (ଗ) ଯାଦୁଛିକତା କ'ଣ ?
 - (ଘ) 'ଭାଷା ପୈତୃକ ସମ୍ପତ୍ତି ନୁହେଁ' - ଉକ୍ତିଟିର ସାର୍ଥକତା ପ୍ରତିପାଦନ କର ।
 - (ଙ) ଉଦାହରଣ ସହ ବିବୃତିମୂଳକ ବାକ୍ୟର ସଂଜ୍ଞା ନିର୍ଣ୍ଣୟ କର ।
 - (ଚ) ଯୌଗିକ ବାକ୍ୟ କାହାକୁ କୁହାଯାଏ ? ଏହାର ଦୁଇଗୋଟି ଉଦାହରଣ ଦିଅ ।
 - (ଛ) 'ମୁଁ ସେ ଦୁଷ୍ଟ ପିଲାଟିକୁ ଜାଣେ' - ଏହି ବାକ୍ୟଟିକୁ ଜଟିଳ ଓ ଯୌଗିକ ବାକ୍ୟରେ ପରିଣତ କର ।
 - (ଜ) ଭାରତ ପରି ଶାନ୍ତିପ୍ରିୟ ଦେଶ ଅଛି କି ? ଏହି ବାକ୍ୟଟିକୁ ବିବୃତି ସୂଚକ ଓ ନାସ୍ତିସୂଚକ ବାକ୍ୟରେ ରୂପାନ୍ତର କର ।
 - (ଝ) ଉଦାହରଣ ସହ ନିର୍ଦ୍ଦେଶାତ୍ମକ ସର୍ବନାମକୁ ଆଲୋଚନା କର ।
 - (ଞ) ପ୍ରଶ୍ନବାଚକ ସର୍ବନାମ କାହାକୁ କୁହାଯାଏ ? ଏହାର ଗୋଟିଏ ଉଦାହରଣ ଦିଅ ।

(ନିମ୍ନୋକ୍ତ ଯେକୌଣସି ୪ଟି ପ୍ରଶ୍ନର ଉତ୍ତର ଦିଅ)

୨. ଆଞ୍ଚଳିକ ଭାଷାର ସଂଜ୍ଞା ନିର୍ଦ୍ଧାରଣ ପୂର୍ବକ ସମ୍ବଲପୁରୀ ଭାଷାର ବୈଶିଷ୍ଟ୍ୟ ନିରୂପଣ କର ।
୩. ଓଡ଼ିଆ ଭାଷାର ସ୍ୱରୂପ ନିର୍ଣ୍ଣୟ କର ।
୪. ଦକ୍ଷିଣାଞ୍ଚଳୀୟ କଥୁତ ଭାଷାର ସ୍ୱରୂପ ଓ ବୈଶିଷ୍ଟ୍ୟ ନିରୂପଣ କର ।
୫. ଓଡ଼ିଆ ଭାଷାର ବୈଶିଷ୍ଟ୍ୟ ନିରୂପଣ କର ।
୬. ରୂପ ଓ ଭାବ ଦୃଷ୍ଟିରୁ ବାକ୍ୟ କେତେ ପ୍ରକାରର ?
୭. ବାକ୍ୟ ରୂପାନ୍ତର କହିଲେ କ'ଣ ବୁଝ ? ଉଦାହରଣ ସହ ବୁଝାଇ ଦିଅ ।
୮. ସର୍ବନାମ ପଦ କାହାକୁ କହନ୍ତି ? ଉଦାହରଣ ସହ ସର୍ବନାମ ପଦର ପ୍ରକାରଭେଦ ଦର୍ଶାଅ ।

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GACR

+3, 5th SEMESTER END EXAMINATION-2018

(ARTS)

Sub.- Political Science

PAPER : DSE - II

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.

Section 'A'

[2 x 8

1. Answer any EIGHT (08) questions from the following.

- i) What is Planning ?
- ii) Define Liberalisation.
- iii) Define privatisation.
- iv) What is mixed economy?
- v) Explain about unorganised Labour.
- vi) Explain about Green Revolution.
- vii) What is Land reform?
- viii) Define Anti Arrak movement.
- ix) Explain about 'Munda Rebbellion'.
- x) What is Naxalism ?

No of Pages : 2

P.T.O.

Section 'B'

Answer any FOUR (4) questions from the following

2. Define planning. Explain the major objectives of planning in India.
3. Explain the factors responsible for the development of the liberisation process in India.
4. Examine the middle class concept and its development in India.
5. Describe the major objectives of land reforms in India.
6. Explain the role of Birsha Munda in the tribal movement 1895 - 1901.
7. Examine the three waves of women's movement in India.
8. Describe the causes for the expansion of Maoist network in India.



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GACR

+3, 5th SEMESTER END EXAMINATION-2018

(ARTS)

Sub.- PSYCHOLOGY

PAPER : DSE - II

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. Write short notes on any **SIX** [2 x6]
- Social stratification
 - Bribery
 - Two short-comings of bio-medical model
 - Prejudice
 - Collective violence
 - Physical intimacy.
 - Alcoholism
 - Crime

Answer any FOUR questions. [12 x 4]

- Discuss different features of caste system.
- What is poverty? Discuss about different concomitants of poverty.
- Explain the development of ideology and discuss the role of small groups in politics.
- What is juvenile delinquency? Discuss juvenile

[2]

delinquency as a form of disorder during adolescence.

6. What is drug abuse? Discuss the main causes of drug abuse.
7. Describe different measures to achieve social integration.
8. Write short notes on any two : [6 x 2
 - a) Love
 - b) Friendship
 - c) Nature of violence
 - d) Rape



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GACR
+3, 5th SEMESTER END EXAMINATION-2018
(ARTS)

Sub.- **Philosophy**
PAPER : DSE-2

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. [2 x 8]
- i) Who was the Political Guru of *Gandhi*?
 - ii) Who instilled in *Gandhi* the respect for manual labour?
 - iii) What is *Satyagraha*?
 - iv) Negatively what is *Ahimsa*?
 - v) How does Gandhi define education ?
 - vi) According to Gandhi what is *Sarvodaya*?
 - vii) What should be the economic basis of society?
 - viii) Cite a quotation of Gandhi about *Swaraj*.
 - ix) How is Gandhi's ideal society?
 - x) Who called Gandhi as Mahatma ?

P.T.O.

Answer any FOUR questions.

[16 x4

2. Explain “Gandhian socialism a way for Sarvodaya”.
3. Sketch Gandhi’s view on education.
4. Give an account of Gandhi’s Satyagraha.
5. Write short notes on:
 - a) The economic basis of society
 - b) Abolition of untouchability
6. Write short notes on ;
 - i) Need and Greed.
 - ii) Social Engineering
7. Explain: ‘Ahimsa is an instrument for world peace.’
8. Write short notes on:
 - a) Human Dignity and freedom
 - b) Establishment of a terrorism-free human society.



+3, 5th SEMESTER EXAMINATION-2018
(ARTS)

Sub: SOCIOLOGY

Full Marks: 80

Paper: DSE-II

Time: 3 Hours

Answer the questions as per instruction.

The figure in the right hand margin indicate marks.

Answer any EIGHT of the following.

[2x8]

1. Define cultural lag.
2. What is primary group.
3. Define Association
4. Define institution
5. Distinguish between society and community.
6. Write short notes on Monogamy.
7. Write short notes on Polygamy.
8. Write short notes on Kinship.
9. Explain family.
10. Explain Religion
11. Distinguish between polygamy and polyandry.
12. Distinguish between sororate and Levirate.
13. Distinguish between patrilocal and matrilocal family.
14. Distinguish between patrilineal and matrilineal family.
15. Mention two characteristics of family.

Answer any FOUR of the following.

[16x4]

1. Discuss different function of family.
2. Define family and discuss its characteristics.

(P.T.O...)

[2]

3. Define kinship and discuss its types.
4. Define religion and discuss the role of religion in society
5. Define society and discuss its functional pre-requisites.
6. Define social group and discuss its characteristics.
7. Define culture and discuss about its characteristics.
8. Discuss the forms of social distribution of power in society.

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No. of Pages: 3

GACR
+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- PHYSICS
(PAPER :DSE - II)

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. [2 x 8]
- a) What do you mean by generalized co-ordinate? Write the form of Lagrange's equation in terms of generalized force.
 - b) For a particular system the Lagrangian is given by $L = L(r, \dot{r}, t)$. Which among the generalized momenta P_r and P_θ are constant?
 - c) A Hydrogen molecule consists of two hydrogen atoms of mass 'M' each. Find the reduced mass of this molecule.
 - d) Write Hamilton's equations of motion.
 - e) What do you mean by normal modes of oscillations and normal mode frequency?
 - f) Write fundamental Poisson's brackets.
 - g) A π^+ meson decays into μ^+ meson and a neutrino with a mean life of 2.5×10^{-8} s in a frame in which it is at rest. If in the laboratory frame its speed is $0.9c$, calculate the expected life time of the particle.

- h) Write the postulates of the special theory of relativity.
- i) Show that a particle with zero rest mass has momentum E/c , where E is its total energy and 'c' is the speed of light.
- j) Write the expression of four-force, i.e. the Minkowski force equation.

Answer any FOUR of the following questions.

2. a) Obtain the Lagrangian for an Atwood machine and hence find the equation of motion. [8]
- b) Derive Lagrange's equation from D'Alembert's principle. [8]
3. a) Derive equation of motion for a system under a central force and hence obtain first integral of motion. [10]
- b) Using Hamilton's equation show that the equations of motion for a one dimensional harmonic oscillator is indeed $m\ddot{x} = -kx$. [6]
4. a) Obtain the expressions for the two normal mode frequencies of oscillation of a double pendulum. [12]
- b) Show that the transformation $P=1/2(p^2+q^2)$, $Q=\tan^{-1}(q/p)$ is canonical. [4]
5. a) By applying Lorentz transformation show that $x^2+y^2+z^2-c^2t^2$ is invariant. [8]
- b) What do you mean by Length contraction in relativistic mechanics? A meter stick moves with [8]

- a velocity of $0.5c$ along its length. What apparent length does an observer measure of it when she is at rest.
6. a) Derive the Einstein's mass-energy conversion formula $E=mc^2$. Give some examples where this formula practically holds. [10]
- b) Show that the square of the magnitude of the velocity four vector is Lorentz invariant. [06]
7. a) Derive Euler-Lagrange equation. [10]
- b) What is principle of least action? [2]
- c) What are different types of generating functions used for canonical transformation? [4]
8. a) Derive an expression for relativistic addition of velocities. A spaceship moving away from earth fires a rocket whose velocity is $0.5c$ in the direction of motion of the ship. If the velocity of the spaceship itself is $0.5c$ with respect to earth, find the velocity of the rocket observed from earth. [10+6]
- b) Describe red shift and blue shift as relativistic Doppler's effect. Discuss Doppler's shift from a four vector perspective.



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GACR
+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)

Sub.- **MATHEMATICS**
(PAPER : DSE - II)

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.

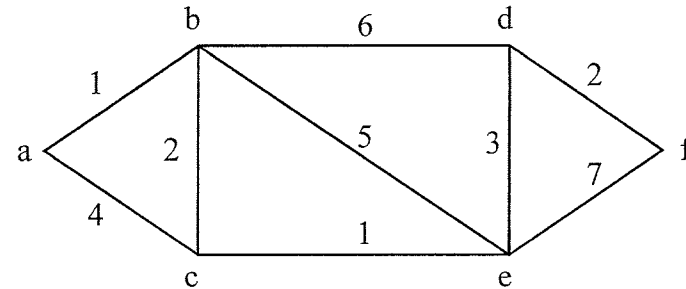
1. Answer any EIGHT. [2 x 8
- a) If p and q are both true then what is the truth value of $(p \rightarrow q) \wedge \bar{q}$ where $\bar{q} = \sim q$.
 - b) What is the minimum number of digits in a group such that two of them are equal ?
 - c) Let $R = \{(a, b), (b, c), (c, c)\}$ be a relation on the set $A = \{a, b, c\}$. Find the transitive closure of R .
 - d) Solve the recurrence relation $a_n = 2a_{n-1} + 3$.
 - e) A complimented distributive lattice is _____ .
 - f) Define planar graph with example.
 - g) Distinguish between walk and path.
 - h) Define chromatic number.
 - i) Let Z be the set of integers. Let for $a, b \in Z$, $a * b = a + b + 1$. Find the identity element for the operation $*$
 - j) Draw a graph having Eulerian circuit but no Hamiltonian circuit.

P.T.O.

Answer any FOUR.

2. a) Prove that $(p \rightarrow q) \rightarrow r$ and $p \rightarrow (q \rightarrow r)$ are not logically equivalent. [8]
- b) Prove that $\sim(\exists x)(\exists y)p(x,y) \Leftrightarrow (\forall x)(\forall y)\sim p(x,y)$
3. a) Prove by mathematical induction [8]
- $$1 + \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} + \dots + \frac{1}{\sqrt{n}} > 2(\sqrt{n+1} - 1)$$
- [8]
- b) Find the number of integers between 500 and 1000 that are divisible by 6 and 9. [8]
4. a) Solve the recurrence relation [8]
- $$a_n - 7a_{n-1} + 10a_{n-2} = 0, a_0 = 2, a_1 = 1$$
- [8]
- b) Define Generating function and use it to solve the recurrence relation [8]
- $$a_n - 9a_{n-1} + 20a_{n-2} = 0, a_0 = -3, a_1 = -10$$
- [8]
5. a) Draw the Hasse Diagram for the divisibility relation on the set $\{1, 3, 7, 11, 21, 33, 77, 231\}$ [8]
- b) Use Warshall's Algorithm to find the transitive closure of R on the set $A = \{1, 2, 3, 4\}$ and $R = \{(2,1), (2, 3), (3,1), (3, 4), (4, 1), (4, 3)\}$ [8]
6. a) Find out the conjunctive normal form and disjunctive normal form of $f(x_1, x_2, x_3) = (x_1 \wedge x_2) \vee (\bar{x}_3 \wedge x_2)$ [8]
- b) Let (A, \leq) be a distributive lattice. If $a \wedge x = a \wedge y$ and $a \vee x = a \vee y$ for some a in A , then prove that $x = y$. [8]

7. a) State and prove Euler's theorem for planer graph. [8]
- b) Find the shortest path using Dijkstra's algorithm from a to f . [8]



8. a) Prove that a non empty connected graph G is Eulerian if and only if its vertices are all of even degree. [8]
- b) Use any algorithm to colour the vertices of the graph in Q. 7(b). [8]



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GACR
+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- STATISTICS
PAPER : DSE-2

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'

1. Answer all questions

[1 x 10

- a) What does a Lorenz curve imply?
- b) Fill in the blanks for doubling time 't' years:
 $P_t = P_0 (1+r)^t$.
- c) Define Age Dependency Ratio
- d) Write the formula for obtaining % of population in the ith age group.
- e) Write the Whipple's index Formula.
- f) State the basic assumption that Myer's blended index is developed.
- g) What is the point open which Optimum theory of population has been criticized?
- h) Write one basic postulate of Malthusian theory of population.
- i) Which development of the country is dealt with theory of Demographic transition. [12
- j) Mention the year of NFHS-1 and NFHS-2 surveys were conducted.

P.T.O.

[2]

Section - 'B'

[10x5

Answer all questions.

2. a) Discuss the steps to obtain the Gini's Concentration Ratio.
b) How do you estimate the parameters of a Logistic curve? Discuss.

OR

- c) Elucidate Rank size rule. Write its limitations.
d) The scale of urbanization is not independent of the arbitrary populations size used to define urban. How do you categorize it?
3. a) How do you represent graphically the age data? Discuss.
b) Describe any two ways of analyzing Age distribution.

OR

- c) Discuss the measures of Aging population.
4. Discuss Whipple's index and how it is calculated.

OR

What is Myer's blended index? Write the steps to obtain the Myer's index.

5. What is the Marxian theory of population? Discuss its basic tenets and criticism.

OR

[3]

State the Neo-Malthusian theory of population. Elaborately differentiate between Malthusian view and Neo-Malthusian view on population.

6. Discuss how the theory of Demographic transition is linked with our Economic development of the country.

OR

Discuss the nature of information collected from 1971 to 2001 census in India.



GACR
+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- MTC
PAPER : DSE - 2

Time: 3 Hours

Full Marks:80

The figure in the right hand margin indicate marks.

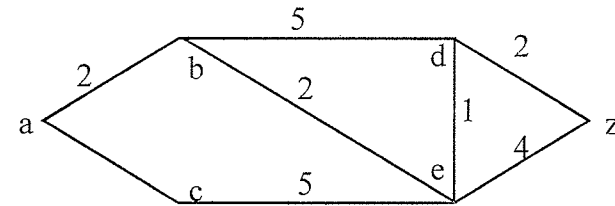
Question No.1 is compulsory, answer any FOUR from the rest.

1. Answer any EIGHT. [2 x 8]
- a) If $p \rightarrow q$ is false then what is the truth value of $q \rightarrow (p \wedge q)$.
 - b) Prove that if x is odd then x^2 is odd.
 - c) How many students at least be there in a class to make it sure that all have different date of birth?
 - d) Find the solution of the recurrence relation
$$a_n = 3a_{n-1} - 2, a_0 = 1$$
 - e) What is the generating function for the set $\{1, 1, 1, 1, \dots\}$.
 - f) Define partial order set with example.
 - g) Draw the Hasse Diagram for the set $A = \{1, 3, 6\}$ for the relation \leq
 - h) Draw a circuit in which there is a Hamiltonian circuit but no Eulerian circuit.
 - i) Find the contrapositive and converse of
"If $2x - 3 = 5$ then $x = 4$ "
 - j) State Four-color theorem.

Answer any FOUR.

2. a) Prove the logical equivalence of $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ [8]
 b) Prove that $n(n+1)(n+5)$ is divisible by 6 using mathematical induction. [8]
3. a) Solve the recurrence relation [8]
 $a_n - 3a_{n-1} + 2a_{n-2} = 2^n, a_0 = a_1 = 1$
 b) Using generating function find the solution of [8]
 $a_{n+z} - a_{n+1} - 2a_n = 0, a_0 = 1, a_1 = -1$
4. a) Find out the number of positive integer ≤ 500 that are not divisible by 8 or 10. [6]
 b) Prove that congruence modulo relation is an equivalence relation. [6]
5. a) Draw the Hasse diagram for the relation divisibility on the set $\{ 2, 3, 4, 6, 8, 12, 24, 48 \}$ [8]
 b) State and prove Euler's theorem for Eulerian graph. [8]
6. a) Prove that $x \oplus (y * z) \leq (x \oplus y) * (x \oplus z)$ for any x, y, z in every lattice. [6]
 b) Prove that a simple graph with n vertices and K components can have $\frac{(n-k)(n-k+1)}{2}$ edges at the most.

7. a) Find the shortest path and its length from a to z using Dijkstra's Algorithm. [8]



- b) Define Chromatic number and use wetch powel algorithm to find the chromatic number of the graph in Q.7 (a). [8]
8. a) Use Warshall's Algorithm to find the Transitive closure of R on the set $A = \{1, 2, 3, 4\}$ where $R = \{(2,1), (2, 3), (3,1), (3, 4), (4,1) (4,3)\}$ [8]
 b) Let $\{A, \leq\}$ be a distributive lattice. If $a \wedge x = a \wedge y$ and $a \vee x = a \vee y$ for some a in A then prove that $x = y$. [8]



No. of Pages: 3

GACR
+3, 5th SEMESTER END EXAMINATION-2018
(ARTS)

Sub.- HISTORY
(PAPER : DSE-II)

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. [8 x 2]
- Ain-I-Akbari
 - Barabati Fort
 - Dora Bisoyi
 - Na-Anka Famine
 - Formation of Utkal Sammilani
 - Maharaja Gajapati Krushna Chandra Dev
 - Non-Co-operation Movement in Odisha
 - Satyavadi School
 - Nilagiri
 - Hirakud Dam

Answer any FOUR questions from the rest 07 questions.

2. Give an account of the Mughal administration in Odisha? [16]

OR

P.T.O.

[2]

Write short notes on:

- a) Maratha rule in Odisha. [8x2
b) Paika rebellion of 1817.
3. Critically review the role of Surendra Sai in resisting British occupation of Sambalpur. [16

OR

Write short notes on:

- a) Chakara Bisoyi in Ghumsar [8x2
b) Dharani Naik in Keonjhar
4. Examine the causes and consequences of the famine of 1866. [16

OR

What social reforms were undertaken in Odisha in the 19th century? [16

5. Assess the Contribution of Utkal Gourabha Madhusudan Das to the growth of Odia Nationalism. [16

OR

Write short notes on:

- a) Formation of separate province of Odisha 1936 [8x2
b) Inchudi Satyagraha
6. Write a note on Gopabandhu's Satyabadi. [16

OR

[3]

Write short notes on:

- a) Sabuja Sahitya [8x2
b) Nava Yuga
7. Give an account of the Prajamandal movement in Odisha. [16

OR

Write short notes on :

- a) Major political parties in Odisha [8x2
b) Problems of development and displacement.
8. Assess the contribution of Harekrushna Mahtab in bringing about the merger of princely states. [16

OR

Evaluate the role of regional political parties in Odisha politics. [8x2



GACR
+3, 5th SEMESTER END EXAMINATION-2018
(COMMERCE)

Sub.- FSAR
PAPER : DSE - 2

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. [8 x 2]
- a) Write down the objectives of financial statement.
 - b) Why balance sheet is prepared?
 - c) What is trend analysis ?
 - d) How do you classify financial statement analysis?
 - e) Find out current ratio where
Current Asset = 1,90,000
Current liability = 85000
 - f) What do you mean by debt.-equity ratio?
 - g) What is multi variate ratio Analysis?
 - h) Give two name of statistical tool used in financial statement analysis.
 - i) Give the format of cash flow statement.
 - j) Give the meaning of Corporate financial reporting.

Answer any FOUR questions. (Each carry 16 marks)

2. “Analysis without interpretation is meaningless and interpretation without analysis is impossible.”

3. What is Common size balance sheet and income statement? Explain the technique of preparing the common size balance sheet.
4. ABC Ltd. made credit sales of Rs. 36,00,000 during the year 2017. If the collection period is 30 days and the year is assumed to be 360 days, Calculate.
- Debtors Turnover
 - Average debtors
 - Debtors at the end if the debtors at the end are more than beginning debtors by Rs. 16,000.
5. a) List the benefits of multivariate Ratio analysis.
b) Explain the statistical tools used in the financial statement analysis.
6. From the following Income statement of 'X' Ltd. for the year ending 31.3.2016 and 2017 prepare a common size statement.

Particulars	31.03.16	31.03.17
Gross Sales	1,51,500	1,41,540
Less Returns	<u>1,500</u>	<u>1,540</u>
Net Sales	1,50,000	---
Less Cost of goods sold	1,05,000	<u>99,400</u>
Gross Profit	<u>4,500</u>	40,600
Expenses		
Selling	7,500	7,500
General	4,500	4,500
Financial	750	620
Total Expenses	12,750	12,620
Net Profit	<u>32,250</u>	<u>27,980</u>

7. a) Give an account of integrated reporting [8
b) Short notes on Non-statutory report. [8
8. The following are the comparative Balance sheet of PQR Ltd. as on 31st March 2016 & 2017.

Liability	2016 Rs,	2017 Rs,	Assets	2016 Rs,	2017 Rs,
Share capital (Share of Rs. 10 Each Profits Los A/c.	35000 5040	37000 5280	Land Stocks Goodwill	10,000 24,000 5000	15,000 21,350 2500
9% Debentures creditors	6000 5160	3000 5920	Cash and Bank Temporary Investment Debtors	4200 300 7100	3500 400 8450
	51,200	51,200		51,200	51,200

Other particulars provided to you are:

- Dividends declared and paid during the year Rs.1750.
- Land was revalued during the year at Rs. 15000 and the profit on revaluation was transferred to profit and loss Account.

You are required to prepare a cashflow statement for the ended 31.03.2017.

