GACR

+3, 5th SEMESTER END EXAMINATION-2018 (SCIENCE)
Sub.- BOTANY
PAPER : DSE-I

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 .   [2 x 6

   a)   What would be the maximum resolving power of a microscope using on oil immersion objective (NA=1.25) & light of wave length 450 nm?

   b)   Shadow casting

   c)   Define partition co-efficient.

   d)   Marker enzymes of mitochondria.

   e)   Uses of mass spectrophotometry

   f)   Give examples of radioisotopes used in biology.

   g)   Applications of ion exchange chromatography.

   h)   Define null hypothesis.

Section - 'B'

Answer any FOUR.   [12

2.   Discusss principles, instrumentation and applications of transmission elctron microscope.

P.T.O.

3. Describe principles, instrumentation & applications of flourescence microscope. [12

4. What is centrifugation? Discuss differential & Density gradient centrifugation. [12

5. What is chromatography? Explain instrumentation & application of HPLC. [12

6. What is electrophoresis? Describe SDS-PAGE & its applications. [12

7. Write short notes on :

   a) Autoradiography [6x2

   b) Affinity chromatography

8. Define standard deviation. Discuss its merits & demerits & compute standard deviation of the data by step deviation method. [12

Age in years	00-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of Patients	6	14	10	8	1	3	8

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Sub.- **Zoology**

PAPER : DSE- 1

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

i) What is Klinotaxis? Explain it with example.

ii) Write a short note on Tidal rhythm.

iii) Explain Pavlov's experiment.

iv) What is waggle dance? What does it signify?

v) Explain Orthokinesis with example.

vi) Comment on behaviour as a basis of evolution.

vii) Write short notes on infanticide.

viii) Explain reciprocal altruism with example.

Answer any FOUR.

2. Give a detail account of innate behaviour with examples.   [12

3. Describe the social organisation in Honey bee.   [12

4. What is reflex? What are the characteristics of reflexes? Add a note on the types of reflexes.   [12

5. Explain courtship behaviour with special reference to three spine stickleback.   [12

P.T.O.

6. What is Circadian rhythm? Explain it with example. [12

7. Explain Hamilton's rule and inclusive fitness with examples. [12

[6x 2

8. Write short notes on :

a) Intrasexual and intersexual selection

b) Instinet vs learning

c) Imprinting.

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Sub.- **MTC**(Programming in C++)
PAPER : DSE - I

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

   a)   Write the difference between white and do-white loop in C++.

   b)   What is C in and C out in C++.

   c)   What is a reference variable . How to implement it?

   d)   What is the use of new and delete operator?

   e)   What is a pointer?

   f)   What is a local variable and global variable.

   g)   What is difference between break and continue statement?

   h)   What is a string? How to declare a string in C++?

Answer any FOUR.
                                                  [6
2. a)   Explain structure programming and its properties.

    b)   Write a programm in C++ to find sum of digits of   [6
         a given integer number.

3. a)   What is a loop? Describe various types of looping   [6
         statements used in C++.

P.T.O.

b) Write a programm in C++ to find GCD (greatest common division) between two given integer numbers.   [6

4. a) What is an operator? Explain different types of operators used in C++.   [6

b) Write a programm in C++ to input two umbers and swap their values by using call by reference method.   [6

   [6

5. a) Write a function in C++ to find factorial of a given integer number.   [6

b) What is metted if. Explain with a suitable example.   [6

6. a) What is an array? Describe different types of array used in C++ with example.   [6

b) Explain different types of data types used in C++ with example.   [6

7. a) Write a programm in C++ to input *n* numbers in to an array and find out target number in it.   [6

b) What is a switch statement. Explain with an example.   [6

8. a) What is a pointer? What are its benefit in C++ programm.   [6

b) Write a programm in C++ to find factorial of a given integer number.   [6

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Sub.- **CSC**

PAPER : DSE - I

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

a)   What are the security services related to the security goods.

b)   What is digital signature?

c)   What is difference between passive attack and active attack?

d)   Define any three security goals.

e)   What is access control

f)   What is firewall?

g)   What is public key cryptography.

h)   What is network security.

Answer any FOUR.

2. a) Distinguish between a stream cipher and a block cipher.   [6

b) Describe columnar transposition cipher with example.   [6

3. a) What is the difference between symmetric key and asymmetric key encryption?   [6

P.T.O.

    b)   Explain RSA algorithm.   [6

4. a)   Explain intrusion detection system   [6

    b)   What is difference between worms and viruses? [6

5. a)   Explain ethical issues in security.

    b)   Explain the threats in network   [6

6. a)   Explain AES algorithm.   [6

    b)   Describe about database security.

7. a)   Explain construction and working principle of [6
       firewall.

    b)   What is Hash function, Explain MDS hash [6
       function.

8.   Write short notes on (any TWO):   [6x2

    i)   Play fair cipher

    ii) Stegonography

    iii) SSL protocols

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Sub.- STATISTICS
PAPER : DSE-I

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.

[2 x 6

1. Answer the following questions. (any SIX)

   a) With which component of Times series is applied in "The Labour Strike in factory".

   b) Explain significance of Time series Analysis.

   c) Explain uses of Time Series Analysis.

   d) How can the annual trend equation be converted to quarterly trend equation?

   e) The Harmonic analysis method is meant for ascertaining...............

   f) To which Component of Time series, the term recession is attached.

   g) Ratio to trend method is used to estimate .... in a time series.

   h) Moving average removes .... and .... variation.

[12

P.T.O.

Answer any FOUR.

2. Explain importance of Time series in business and economics. [12

3. What do you mean by Time series? Describe the Moving average method for determining trend. Explain how the method is related to the method of fitting curves by the principles of least squares. [12

4. Explain how will you decide about the type of trend to be fitted to a given time series data. Describe Modified exponential curve. [12

5. Derive Spencer's 15 Point Formula. [12

6. What are the steps involved in Ratio to Moving Average Method and also explain Merits and Demerits. [12

7. Briefly explain Harmonic analysis. Explain its uses advantages and disadvantages. [12

8. What do you mean by Seasonal variations in a time series? Give example. Explain the link relative method of computing the indices of seasonal variation. [12

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+3, 5th SEMESTER END EXAMINATION-2018

(ARTS)

Sub.- History

(PAPER : DSE- I)

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

   a)   261 B.C.

   b)   Hatigumpha Inscription

   c)   Tribhubana mahadevi I

   d)   The Panduvamsis

   e)   Anantavarman Chodaganga Deva

   f)   Parsvanath in Odisha

   g)   Ratnagiri Vihara

   h)   Shri Chaitanya

   i)   Rekha Deula   .

   j)   Langula Narasingha Deva

Answer any FOUR from the rest 07 questions.   [16

2.   Describe the causes and results of Kalinga War.

                              OR

Write short notes on: [8x2

   a)   Kharavela's conflict with Magadha

   b)   Historical geography of Kalinga.

3.   Trace the origin and history of the Sailodbhavas [16
of Kangoda.

OR

[8x 2

Write short notes on:

a)   Buddhism and the early Bhaumakars

b)   The Somavamsis of Kosala and Utkala.

4.   Assess the significence of the rule of imperial [16
Gangas towards the formation of a regional
kingdom.

OR   [16

Indicate the factors leading to the fall of Odishan
empire.

5. Give a brief account of the history of Jainism in Odisha. [16

OR

Write short notes on :

[8x 2

a)   Saivism in Odisha

b)   The cult of Jagannath

6.   Trace the history of Buddhism in Odisha. [16

OR

Account for the growth of Vaishnavism in Odisha. [16

7.   Make a critical appreciation of Buddhist art and [16
architecture in Odisha.

OR

Write short notes on :

a)   Satrughaneswar group of Temples.   [8x 2

b)   Parasurameswara Temple

8.   Discuss the salient features of Kalinga style of
Temple architecture.   [16

OR

Write short notes on :

a)   Mukteswar Temple

b)   Sun Temple of Konarka.

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GACR

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

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.

[2 x 8

1.   Answer any EIGHT of the following.

 a)   Calculate the parity of s and p electrons and compare it with the parity an α - particle with total angular momentum of 4 units.

 b)   Define electric, quardrupole moment of a nucleus. How it depends on the angular moment of the neucleus?

 c)   Determine the necleus that has the radius one third of Ar ^{216}.

 d)   Determine spin and parity for the ground states of the following nuclei: ^{7}Li ^{11}C, ^{17}O.

 e)   Write down the condition of nuclear stability.

 f)   What is an electron capture process in nuclear beta decay?

 g)   Complete the reaction.

$$B_5^{10} + He_2^4 \rightarrow \quad ; \quad B_5^{10} + n_0^1 \rightarrow$$

P.T.O.
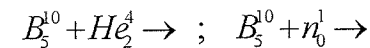
h) Define Q-vlaue of nuclear reaction.

i) Write down different types of the solid state detectors used to detect protons, alpha particles, electrons, beta particles and gamma rays.

j) What are quarks and anti quarks? Explain protons and neutrons are the combination of 3 quarks.

Answer any FOUR of the following questions. [16x4

2. Write notes on the following nuclei properties:

(a) Binding energy (b) Parity

[16

(c) Electric moment and (d) Nuclear size

3. Discuss various semi-emprical formulas developed on the basis of liquid drop model to account for [16 binding energy for nucleus. From this obtain the semi-empirical mass formula.

4. What are magic numbers? Discuss how nuclear shell model explaining the evidence of magic [2+14 numbers and nuclear properties such as spin, magnetic moment and energy levels.

5. a) Discuss in details the Gamow's theory of alpha decay. [12+4

b) Polonium 212 emits an alpha particle whose kinetic energy is 10.54 MeV. Determine the disintergration energy, momentum and the energy of the recoil nucleus.

6. Describe the construction and working of the G M [16 counter. What is quenching in G M Counter? Explain dead time and recovery time.

7. What are semiconductor detectors? Describe the construction and operation of such detectors. Write [16 the advantages of such detectors over other detectors.

8. a) Discuss in details the classification of elementary [10+6 paricles.

b) Check the law of conservation, such as charge, parity baryon number, lepton number, isospin, hypercharge and strangeness for the following relation.

i) $p + p \rightarrow K^{+} + \Sigma^{+}$

ii) $\pi^{-} + p \rightarrow \Sigma 0 + \dots\dots$

iii) $\pi \rightarrow p + e^{-} + \bar{v}$

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+3, 5th SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- ETC
PAPER : DSE- 1

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

   a)   Write different features of 8051 and 8052 micro controller.

   b)   What do you mean by PSW register? List all the bits of PSW register.

   c)   Define baud rate. Explain with example.

   d)   Differentiate ACALL and LCALL instruction.

   e)   Find the biggest count that can be stored in timer register when operated in mode 2.

   f)   What will register A and B hold after DIV AB instruction B executed?

   g)   Mention the role of line drivers in serial communication.

   h)   Define full scale output voltage and resolution of DAC.

   i)   Calculate number of steps per revolution for a step angle of 7.5 degree.   [8

   j)   Write any two applications of embedded system.

P.T.O.

Answer any FOUR.

2. a) What are the purposes of internal RAM in 8051 [8
mc? Explain different segments of RAM.

 b) What is stack? Write the functions of stack pointer. [8
Explain with PUSH and POP operation.

3. a) What is polling? How is it different from interrupt? [8
How the interrupt priority is decided?

 b) Write the classification of 8051 instruction set. [8
Explain with example.

4. a) What do you mean by Addressing mode? With [8
example, discuss immediate addressing mode and
indirect addressig mode.

 b) Write an assembly language program to grenerate [8
a time delay of 5 milli second . Assure XTAL
frequency =11.0592 MHz.

5. a) Write an assembly program to accept 10 numbers
from P1. Then store The biggest numbers in RAM [16
location 48H.

6. a) Write an assembly program to generate 20 KHz
square wave with 50% duty cycle in port pin P2.5. [8
Use 8 bit Auto Reloader mode of Timer 1.

 b) What is the objective of 8255 chip? Discuss the [8
features of 8255. Also explain various pin of 8255
chip.

7. a) With the help of a neat diagram show how DAC [8
is interfaced to 8051.

 b) What do you mean by serial data transfer. Briefly [8
explain 8051 connections to Rs 232.

8. Describe the 8051 connection to stepper motor. [16
Write assembly language program to rotate it
contineously.

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+3, 5ᵗʰ SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- Mathematics
PAPER : DSE - I

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.

[2 x 8

1.   Answer any EIGHT.

a)   If $a|b$ and $b|a$ then prove $a = \pm b$.

b)   Define composite numbers and write down the composite numbers ≤ 10.

c)   Define g.c.d. and find g.c.d. (231, 133).

d)   Find the solution set of $3z \equiv 2$ (mod 7)

e)   State Fermat's little theorem.

f)   Define multiplicative function, then $f * g$ is multiplicative or not of f and g are multiplicate.

g)   What do you mean by "f is asymptotically equivallent to g". Illustrate it by an example.

h)   Define Euler phi function and find $\phi(12) = $?

i)   State Euler's crieterion.

j)   When an integer a can be said to be quadratic residue modulo n.

Answer any FOUR.

2. a) Prove that every non-zero integer n can be expressed as $n = p_1^{e_1} p_2^{e_2} \dots p_r^{e_r}$, where $p_1 \dots p_r$, are distinct prime and $e_1, e_2, \dots, e_r$ are +ve integers. [8

   b) State and prove Euclid's Algorithm. [8

3. a) Let $a, b, n \in \mathbb{Z}$ with $n > 0$ and $a \equiv b \pmod{n}$. Prove that $g.c.d.\ (a, n) = g.c.d.\ (b,n)$ [8

   b) If n is an integer greater than 1, then prove that n does not divide $2^n - 1$. [8

4. a) Prove that if f is a multiplicative function, then its Dirichlet inverse is also multiplicative. [8

   b) Let f and F be arithmetic functions. Then prove that $F = 1 * f$ if and only if $f = \mu * F$. [8

5. a) Let n be a positive integer and $\alpha \in \mathbb{Z}_n^*$. Then prove that $\alpha^{\phi(n)} = 1$. [8

   b) Let n $n \in \mathbb{Z}$ and $n > 1$. Prove that n is prime if and only if $\alpha^{n-1} = 1$ for every non-zero $\alpha \in \mathbb{Z}$ n. [8

6. a) Prove that for every prime p, and every $\alpha \in \mathbb{Z}_p$, $\alpha^p = \alpha$. [8

   b) Let p be an odd prime number and $\beta \in \mathbb{Z}_p$. Then prove that $\beta^2 = 1$ if and only if $\beta = \pm 1$. [8

7. a) Let p be an odd prime. Then prove that (-1) is a quadratic residue modulo p if and only of $p \equiv \pmod 4$. [8

   b) State and prove Thue's Lemma. [8

8. Write short notes on (any TWO): [8+8

   a) Equivalence class

   b) Quadratic residues

   c) Legender symbol and properties.

   d) Polynomial congruence.

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+3, 5ᵗʰ SEMESTER END EXAMINATION-2018
(SCIENCE)
Sub.- CHEMISTRY
PAPER : DSE- I

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

1.   Answer any EIGHT questions.   [2 x 8

   a)   Write the IUPAC Name of

        (i)   PVC   (ii)   Nylon 6.6

   b)   Natural rubber is basically a polymer of which compound?

   c)   Name two natural polymers which are used as textile fibers.

   d)   What is the commercial name of phenol formal-dehyde resin?

   e)   What is Ziegler - Natta catalyst ?

   f)   What is the order of size of the individual polymer molecule ?

   g)   Write the name of the polymer from which small jars, storage containers ar prepared?

   h)   What is Ebonite? What is its use?

   i)   Define and explain glass transaction temperature?

   j)   What are the disadvantages of uses of plastics over metals.

P.T.O.

Group - B

Answer any FOUR.

2. Write short notes on:
    a) Texture of polymer [8
    b) Molecular force and chemical bonding in polymer [8

3. a) What do you mean by functionality? Find the functionality [8
    (i)   Acetylene   (ii) Ethylene Glycone
    (iii) Ethyl alcohol   (iv) Phenol
    b) Write in detail the classification of polymerization process.

4. Discuss in detail Anionic polymerization, (mechanism and kinetics) [16

5. What is the crystalline melting point *Tm* of a polymer? What are the factors that influence the crystlline melting point? [16

6. a) What is solubility parameter? How this is determined for small organic compounds and polymers? [8
    b) Differentiate between thermo setting and thermo plastic polymers. [8

7. a) What is monomer of PVC? Write its method of preparation, properties and uses. [8
    b) Who discovered polystyrene? How it is prepared? Discuss high impact polystyrene (HIPS). [8

8. a) What do you mean by polydisperisity of the polymer? How it is expressed? Explain and represent graphically. [4
    b) The molecular weight distribution curve for hypothetical poly dispersed polymer sample. [4
    c) The molecular weight distribution curves of two hypothetical poly dispersed polymer samples with the same number average molecular weight but different poly dispersities. [4
    d) Molecular weight distribution curves for three hypothetical samples with different polydispersities. [4

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