SLR-ST – 202

Seat No.	

Set P

B.Sc. – III (Semester – V) Examination, 2018
COMPUTER SCIENCE
Special Paper – VIII : Core Java
(CGPA Pattern)

Day and Date : Monday, 16-4-2018 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***full*** *marks.*

1. A) Choose the correct alternatives : **10**

1) Which of these can be overloaded ?
a) Methods b) Constructors
c) All of the mentioned d) None of the mentioned

2) Which of these class is not included in java.lang ?
a) Byte b) Integer c) Int d) Class

3) Which of these cannot be declared static ?
a) Class b) Object c) Variable d) Method

4) Which of these methods must be made static ?
a) main () b) delete () c) run () d) finalize ()

5) Which of these keywords can be used to prevent method overriding ?
a) Static b) Constant c) Protected d) Final

6) Which of these is supported by method overriding in Java ?
a) Abstraction b) Encapsulation
c) Polymorphism d) None of the mentioned

7) Which of these method of FileReader class is used to read characters from a file ?
a) read () b) scanf () c) get () d) getInteger ()

8) Which of the following package stores all the standard java classes ?
a) lang b) java c) util d) java.packages

9) Which of these method is used to find out that a thread is still running or not ?
a) run () b) Alive () c) isAlive () d) checkRun ()

10) Which of these methods can be used to output a string in an applet ?
a) display () b) print () c) drawString () d) println ()

P.T.O.

B) State **true/false** : **4**

1) The system class is available in package java.lang.
2) FileReader and FileWriter is a byte stream class.
3) Finally block is executed after catch block is executes.
4) The class throwable is at the top of the exception class hierarchy.

2. Solve **any seven** from the following : **14**

1) Garbage collection
2) Byte code
3) Wrapper classes
4) Final keyword
5) this reference
6) super keyword
7) Object class
8) Static block
9) Nested classes.

3. A) Attempt **any two** : **10**

1) Write a program to overload constructors.
2) Differentiate between abstract class and interface.
3) Explain throw clause with example.

B) Write a short note on synchronization. **4**

4. Attempt **any two** : **14**

1) Discuss various features of java program in details.
2) Explain applet life cycle.
3) Explain different types of layout managers.

5. Attempt **any two** : **14**

1) Explain any two character stream classes.
2) Explain different event listeners and adapters.
3) Explain the thread life cycle.

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B.Sc. III (Semester – V) (CGPA) Examination, 2018
PHYSICS (Special Paper – IX)
(Classical Mechanics)

Day and Date : Tuesday, 17-4-2018 Total Marks : 70
Time : 2.30 p.m. to 5.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **full** marks.*
*3) Use of logarithmic table is **allowed**.*
*4) **Neat** diagrams must be drawn **wherever** necessary.*

1. Select the correct alternative from the following : **14**

i) Any rigid body having large number of particles has _____ degrees of freedom.

a) 2 b) 3 c) 5 d) 6

ii) In conservative force field _____ remains constant.

a) Linear momentum b) Angular momentum
c) Energy d) Both a) and b)

iii) In southern hemisphere, due to Corioli's force, cyclone deflects towards

a) North b) South c) East d) West

iv) In absence of air resistance; the time of flight of projectile is

a) 2 uv/g b) uv/g c) uv/2g d) 2v/g

v) Acceleration of Atwood's machine is

a) $\ddot{x} = \frac{(M_1 \cdot M_2)g}{(M_1 + M_2)}$ b) $\ddot{x} = -\frac{(M_1 \quad M_2)g}{(M_1 + M_2)}$

c) $\ddot{x} = \frac{(M_1 + M_2)g}{(M_1 \cdot M_2)}$ d) $\ddot{x} = \frac{(M_1 - M_2)}{(M_1 + M_2)}$

P.T.O.

vi) In the symmetric mode of oscillations, the particles are always

a) In phase b) Out of phase c) With $\pi/2$ phase d) With $\pi/4$ phase

vii) D'Alembert's principle is _____ principle.

a) Differential b) Calculus c) Integral d) Extreme

viii) In rigid body motion, the quantities I_{XY}, I_{YZ}, I_{ZX} are called

a) Moment of inertia b) Product of inertia

c) Measured inertia d) Tensor

ix) The principle of virtual work is

a) $\sum Fi^{a}.\delta ri = 0$ b) $\sum fi\ .\delta ri = 0$

c) $\sum Fi.\ \delta ri = 0$ d) $\sum Fi^{a}.\ \delta ri = 0 + \sum fi\ .\delta ri = 0$

x) The energy transfer from an oscillator to its coupled partner is periodic and takes place with the period

a) $T = \frac{2\pi}{\omega_1 - \omega_2}$ b) $T = \frac{3\pi}{\omega_1 - \omega_2}$ c) $T = \frac{5\pi}{\omega_1 - \omega_2}$ d) $T = \frac{4\pi}{\omega_1 - \omega_2}$

xi) If a particle is at rest in a rotating frame of reference, the Coriolis force acting on it is

a) zero b) minimum c) maximum d) infinity

xii) If constraints are introduced into a system, its number of degrees of freedom

a) are reduced b) are increased

c) remains the same d) none of these

xiii) A rigid body in motion can be completely specified if its

a) Position and orientations are given

b) Only positions is given

c) Only orientations are given

d) All of the above

xiv) Foucault's pendulum offers a visual convincing proof of

a) Rotation of the sun b) Earth's rotation

c) Rotation of the moon d) Rotation of the universe

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2. Answer **any seven** of the following. **14**

   i) What is a rigid body ?

   ii) Define symmetric and antisymmetric mode of oscillations.

   iii) What is pseudo force ?

   iv) State Hamilton's principle.

   v) Define range and trajectory of projectile.

   vi) What are constraints ?

   vii) State the principle of virtual work.

   viii) Give the characteristics of inertial frame of reference.

3. A) Answer **any two** of the following : **10**

      i) Show that the shortest distance between two points in space is a straight line.

      ii) State and prove conservation theorem for energy of a particle.

      iii) Obtain angular momentum of a rigid body.

   B) Explain the effect of Coriolis force on a freely falling body under the action of gravitational force. **4**

4. Answer **any two** of the following : **14**

   i) State and prove Brachistochrome problem.

   ii) Show that the angular acceleration of a particle is the same in fixed and rotating coordinate system.

   iii) Define projectile motion and obtain an expression for time of flight in resistive and non resistive medium.

5. Answer **any one** of the following : **14**

   i) State and explain D'Alembert's principle and obtain Lagrange's equations from it. **10**
   Obtain an expression for acceleration of Atwood's machine. **4**

   ii) What are coupled oscillations ? Obtain an expression for frequency of coupled oscillatory system. **10**
   Explain normal modes and normal coordinates of coupled oscillatory system. **4**

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