

Vivekanand College, Kolhapur. (Autonomous)
Department of Physics
Internal Examination Notice
2021-22

Date: 05/01/2022

All students of class B.Sc. I, B.Sc. II and B.Sc. III are hereby noticed that the first term internal evaluation examination is scheduled as per following time table.

Nature of question paper:

For B.Sc. I : Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 20 marks

For B.Sc. II : Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks

For B.Sc. II (Astro) : Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks

For B.Sc. III : Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks


Internal Evaluation Examination 2021-22.

SEM I, SEM III and SEM V

Time Table

Sr. No.	Class	Paper	Date	Time
1.	B.Sc. I	Paper I	12/01/2022	11:00 am to 12:00 pm
2.	B.Sc. II	Paper III	12/01/2022	11:00 am to 12:00 pm
3.	B.Sc. II (Astrophysics)	Paper I	13/01/2022	04:00 pm to 05:00 pm
4.	B.Sc. III	Paper V (section I)	14/01/2022	11:00 am to 12:00 pm
		Paper V (section II)		01:00 am to 02:00 pm
		Paper VI (section I)	15/01/2022	11:00 am to 12:00 pm
		Paper VI (section II)		01:00 am to 02:00 pm




HOD, Physics
Head of the
Department of Physics
Vivekanand College, Kolhapur

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Autonomous)

Department of Physics

Internal exam (2021-22)

B.Sc.III Sem V

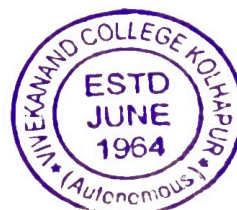
Attendance Sheet

Roll No.	Name Of Student	Signature			
		26/05/22	26/05/22	27/05/22	27/05/22
7751	Bam Shruti Harish				
7752	Bhatmare Shivani Sanjay				
7753	Chauhan Aditi Brijesh				
7754	Dhamanekar Deepa Anil				
7755	Dharaniya Jitendra Govindram				
7756	Dhumale Swapnil Sahebrao				
7757	Gove Vaishnavi Shashikant				
7758	Gudami Shrinivas Mallappa				
7759	Inamdar Raturaj Sharad				
7760	Kamble Abhishek Pandurang				
7761	Khekare Kallesh Chandrakant				
7762	Kumbhar Gaurav Dinkar				
7763	More Akshada Vijay				
7764	Mude Gargi Anil				
7765	Naik Mitali Vijay				
7766	Patil Asmita Ramesh				
7767	Patil Snehal Suresh				
7768	Potdar Abhishek Sharad				
7769	Shirke Pranali Pradeep				
7770	Singh Rohit Sanjay				

Internal Examiner.....



11. A transformation from set (q,p) to set (Q,P) is canonical if----
- A] Hamilton's equation retains their form
 B] Lagrange's equation retains their form
 C] Both Lagrange's and Hamilton's equation retain their form
 D] Newton's laws valid in both set
12. Which of the following transformation is canonical
- A] $P=q$ and $Q=p$ B] $P=q$ and $Q=-p$
 C] $Q=-p$ and $P=-q$ D] $Q=p$ and $P=-q$
13. Moments are variables
- A] dependent B] independent
 C] partially dependent D] partially independent
14. The Lagrangian is defined as
- A] $L= T-V$ B] $L= T+V$
 C] $L= 2T+V$ D] $L= 2T-V$
15. A rigid body moving freely in space has a -----degree of freedom
- A] 3 B] 4 C] 6 D] 9
16. Virtue of the following is variant under Galilean transformation
- A] velocity B] acceleration
 C] newtons laws of motion D] laws of conservation of momentum
17. The reference frame in which Fundamental laws of physics are invariant are called----
- A] non inertial frame B] rotational frame
 C] inertial frame D] flavor tattooed to earth
18. What is the mean life of π^+ Meson moving with the speed of 0.73 c when their proper life is 2.5×10^{-8} sec
- A] 3×10^{-8} sec B] 3.2×10^{-8} sec
 C] 3.6×10^{-8} sec D] 3.5×10^{-8} sec
19. The rest mass of photon IS----
- A] 0 B] 9.1×10^{-31} kg
 C] $h\nu/c$ D] $h\nu$
20. The kinetic energy of a particle moving with relativistic velocity is----
- A] mc^2 B] $\frac{1}{2}mc^2$
 C] $mc^2 - m_0c^2$ D] m_0c^2



19
20

Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

B.SC. III SEMESTER V

Roll No - 7766 Subject: Classical mechanics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

1. Generalized coordinates are clearly ----- of one another

A] independent

B] dependent

C] same

D] equal and opposite'

2. In Lagrange's Equation if there are N number of particles and so the generalized coordinated are

A] $n=N-k$

B] $n=3N-k$

C] $n=3N$

D] $n=3n-k$

3. In Lagrange's Equation Virtual Displacement does not involve

A] Space

B] Time

C] N number of particles

D] None

4. The momentum of the moving particle in the x-axis is

A] $P=1/2 mx$

B] $P= mx'$

C] $P=mx$

D] None

5. The generalized momentum P_i need not always _____ of linear momentum.

A] Speed

B] Velocity

C] Dimension

D] Displacement

6. The simple mechanical system involving constraint is the Atwood's machine pulley is assumed---

A] Friction less

B] mass less

C] having mass and friction

D] Mass and friction less

7. Weight move vertically having--- degree of freedom.

A] 1

B] 2

C] 3

D] 4

8. The degree of freedom for a free particle in space are----

A] n

B] 3n

C] 3

D] 1

9. Double pendulum has --- degree of freedoms.

A] 1

B] 2

C] 3

D] 4

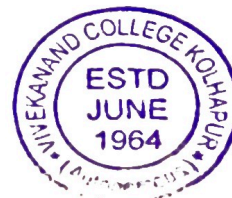
10. The generalized coordinates for motion of a particle moving on the surface of a sphere of radius 'a' are

A] a and θ

B] a and ϕ

C] θ and ϕ

D] 0 and ϕ



11. A transformation from set (q,p) to set (Q,P) is canonical if----

- A) Hamilton's equation retains their form
- B) Lagrange's equation retains their form
- C) Both Lagrange's and Hamilton's equation retain their form
- D) Newton's laws valid in both set

12. Which of the following transformation is canonical

- A) $P=q$ and $Q=p$
- B) $P=q$ and $Q=-p$
- C) $Q=-p$ and $P=-q$
- D) $Q=p$ and $P=-q$

13. Moments are variables

- A) dependent
- B) independent
- C) partially dependent
- D) partially independent

14. The Lagrangian is defined as

- A) $L = T - V$
- B) $L = T + V$
- C) $L = 2T + V$
- D) $L = 2T - V$

15. A rigid body moving freely in space has a -----degree of freedom

- A) 3
- B) 4
- C) 6
- D) 9

16. Virtue of the following is variant under Galilean transformation

- A) velocity
- B) acceleration
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18. What is the mean life of π^+ Meson moving with the speed of $0.73c$ when their proper life is 2.5×10^{-8} sec

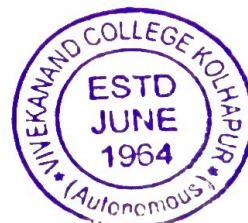
- A) 3×10^{-8} sec
- B) 3.2×10^{-8} sec
- C) 3.6×10^{-8} sec
- D) 3.5×10^{-8} sec

19. The rest mass of photon is----

- A) 0
- C) $h\nu/c$
- B) 9.1×10^{-31} kg
- D) $h\nu$

20. The kinetic energy of a particle moving with relativistic velocity is----

- A) mc^2
- B) $1/2mc^2$
- D) m_0c^2
- C) $mc^2 - m_0c^2$



Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

B.SC. III SEMESTER V
Subject: Mathematical Physics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

1. In spherical polar coordinate system, there lies symmetry about
a) **A point** b) an axis c) a plane d) curve
2. In cylindrical coordinate system, there lies symmetry about
a) A point b) **an axis** c) a plane d) curve
3. Three coordinates of spherical polar coordinate system are
a) x,y,z b) **r, θ , ϕ** c) r, θ , z d) r, ϕ , z
4. Three coordinates of Cylindrical polar coordinate system are
a) x,y,z b) r, θ , ϕ c) **r, θ , z** d) r, ϕ , z
5. In orthogonal curvilinear coordinate system, the coordinate surfaces are in general
a) Plane b) **curved** c) spherical d) linear
6. In orthogonal curvilinear coordinate system, the coefficients h_1 , h_2 , h_3 are called
a) Scale coordinates b) scale coefficients c) **scale factors** d) scale turn
7. In which of the following have dimensions of length?
a) h_1, h_2, h_3 b) u_1, u_2, u_3 c) **h, u₁** d) $h_1 u_2$
8. In Cartesian coordinate system $h_1 = h_2 = h_3 = \dots\dots\dots$
a) 0 b) **1** c) r d) $\frac{1}{4}$
9. Which of the following is the equivalent of u_1 in cylindrical coordinate system?
a) **r** b) θ c) ϕ d) z
10. In spherical polar coordinate system, $h_3 = \dots\dots\dots$



- a) r b) $\sin \theta$ c) $r \sin \theta$ d) $\cos \theta$

11. Three coordinates of cartesian coordinate system are

- a) x, y, z b) r, θ, ϕ c) r, θ, z d) r, ϕ, z

12. If the angles between the coordinate surfaces change from point to point the coordinate system is called coordinate system

- a) Cartesian **b) curvilinear** c) orthogonal curvilinear d) cylindrical

13. In orthogonal curvilinear coordinate system the coordinate surfaces areeverywhere.

- a) parallel **b) mutually perpendicular** c) normal d) abnormal

14. In Cartesian coordinate system $u_1 = \dots\dots\dots$, $u_2 = \dots\dots\dots$ and $u_3 = \dots\dots\dots$

- a) **x, y and z** b) y, z and x c) z, x and y c) xy, yz and zx .

15. In spherical polar coordinate system $u_1 = \dots\dots\dots$, $u_2 = \dots\dots\dots$ and

$u_3 = \dots\dots\dots$

- a) **r, θ and ϕ** b) ϕ, θ and r c) θ, r and ϕ d) r, ϕ, θ and r, θ

16. In cylindrical coordinate system $h_1 = \dots\dots\dots$, $h_2 = \dots\dots\dots$ and $h_3 = \dots\dots\dots$

- a) **$1, r$ and 1** b) r, l and 1 c) $1, l$ and r d) $1, l, 3$

17. In spherical polar coordinate system $h_1 = \dots\dots\dots$, $h_2 = \dots\dots\dots$ and

$h_3 = \dots\dots\dots$

- a) $1, r$ and $\sin \theta$ **b) $1, r$ and $r \sin \theta$** c) $1, l$ and r d) r, r and $\sin \theta$.

18. The Cartesian coordinate system is also called as coordinate system.

- a) **Orthogonal** b) curvilinear c) orthogonal curvilinear d) cylindrical

19. In orthogonal curvilinear coordinate system u_1, u_2 and u_3 are

- a) **constant** b) variables c) invariable d) infinite.

20. In orthogonal curvilinear coordinate system $h_1 u_1, h_2 u_2$ and $h_3 u_3$ have dimensions of

- a) area b) volume **c) length** d) cube



20
20

Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

Roll NO - 7759

B.SC. III SEMESTER V
Subject: Mathematical Physics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

1. In spherical polar coordinate system, there lies symmetry about
a) A point b) an axis c) a plane d) curve
2. In cylindrical coordinate system, there lies symmetry about
a) A point b) an axis c) a plane d) curve
3. Three coordinates of spherical polar coordinate system are
a) x,y,z b) r, θ , ϕ c) r, θ , z d) r, ϕ , z
4. Three coordinates of Cylindrical polar coordinate system are
a) x,y,z b) r, θ , ϕ c) r, θ , z d) r, ϕ , z
5. In orthogonal curvilinear coordinate system, the coordinate surfaces are in general
a) Plane b) curved c) spherical d) linear
6. In orthogonal curvilinear coordinate system, the coefficients h_1 , h_2 , h_3 are called
a) Scale coordinates b) scale coefficients c) scale factors d) scale turn
7. In which of the following have dimensions of length?
a) h_1, h_2, h_3 b) u_1, u_2, u_3 c) h, u_1 d) $h_1 u_2$
8. In Cartesian coordinate system $h_1 = h_2 = h_3 = \dots$
a) 0 b) 1 c) r d) $\frac{1}{4}$
9. Which of the following is the equivalent of u_1 in cylindrical coordinate system?
a) r b) θ c) ϕ d) z
10. In spherical polar coordinate system, $h_3 = \dots$



- a) r b) $\sin \theta$ **c) $r \sin \theta$** d) $\cos \theta$

11. Three coordinates of cartesian coordinate system are

- a) x, y, z** b) r, θ, ϕ c) r, θ, z d) r, ϕ, z

12. If the angles between the coordinate surfaces change from point to point the coordinate system is called coordinate system

- a) Cartesian **b) curvilinear** c) orthogonal curvilinear d) cylindrical

13. In orthogonal curvilinear coordinate system the coordinate surfaces are everywhere.

- a) parallel **b) mutually perpendicular** c) normal d) abnormal

14. In Cartesian coordinate system $u_1 = \dots\dots\dots$, $u_2 = \dots\dots\dots$ and $u_3 = \dots\dots\dots$

- a) x, y and z** b) y, z and x c) z, x and y d) xy, yz and zx .

15. In spherical polar coordinate system $u_1 = \dots\dots\dots$, $u_2 = \dots\dots\dots$ and

$u_3 = \dots\dots\dots$

- a) r, θ and ϕ** b) ϕ, θ and r c) θ, r and ϕ d) r, ϕ, θ and r, θ

16. In cylindrical coordinate system $h_1 = \dots\dots\dots$, $h_2 = \dots\dots\dots$ and $h_3 = \dots\dots\dots$

- a) $1, r$ and 1** b) $r, 1$ and 1 c) $1, 1$ and r d) $1, 1, 3$

17. In spherical polar coordinate system $h_1 = \dots\dots\dots$, $h_2 = \dots\dots\dots$ and

$h_3 = \dots\dots\dots$

- a) $1, r$ and $\sin \theta$ **b) $1, r$ and $r \sin \theta$** c) $1, 1$ and r d) r, r and $\sin \theta$.

18. The Cartesian coordinate system is also called as coordinate system.

- a) Orthogonal** b) curvilinear c) orthogonal curvilinear d) cylindrical

19. In orthogonal curvilinear coordinate system u_1, u_2 and u_3 are

- a) constant** b) variables c) invariable d) infinite.

20. In orthogonal curvilinear coordinate system $h_1 u_1, h_2 u_2$ and $h_3 u_3$ have dimensions of

- a) area b) volume **c) length** d) cube



Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

B.SC. III SEMESTER V

Subject: Nuclear and Particle physics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

- 1) Primary cosmic rays consist of.....
a) Electron b) protons c) neutrons d) mesons
- 2) Which one is not a fundamental particle ?
a) proton b) meson c) neutrino d) alpha particles
- 3) Spin of photon is.....
a) 1 b) 1/2 c) -1 d) -1/2
- 4) Mass of neutrino is.....
a) equal to proton b) equal to electron c) equal to neutron d) Zero
- 5) Origin of cosmic rays is.....
a) Sun b) universe c) moon d) Jupiter
- 6) Intensity of cosmic rays is maximum at.....
a) middle of the earth b) right corner of earth c) Magnetic poles d) a and b
- 7) Proton is made up of.....
a) Positron b) electron c) neutrino d) quark
- 8) In a nuclear reaction which of the following is conserved ?
a) momentum b) charge c) energy d) All
- 9) Baryons are the
a) bosons b) fermions c) leptons d) hyperons
- 10) Are the agent of interaction between particles inside the nucleus.
a) mesons b) leptons c) fermions d) photons



d) 2 fermi

17. The force between a neutron and proton inside the nucleus is----

a) only nuclear attractive

b) only coulomb force

c) both A and B

d) none of above

18. The speed of Yukawa particle is s=-----

a) Zero

b) one

c) zero to one

d) -1

19. The nuclear force is spin---

a) dependent

b) independent

c) may be or may not be independent

d) may be or may not be dependent

20. Yukawa particle is only----

a) π^0 mesons

b) π^- mesons

c) π^+ mesons

d) all $\pi^0 \pi^- \pi^+$ mesons



20
20

Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

Roll No :- 7764

B.SC. III SEMESTER V

Subject: Nuclear and Particle physics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

1) Primary cosmic rays consist of.....

- a) Electron b) protons c) neutrons d) mesons

2) Which one is not a fundamental particle ?

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3) Spin of photon is.....

- a) 1 b) 1/2 c) -1 d) -1/2

4) Mass of neutrino is.....

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a) Zero

b) one

c) zero to one

d) -1

19. The nuclear force is spin---

a) dependent

b) independent

c) may be or may not be independent

d) may be or may not be dependent

20. Yukawa particle is only----

a) π^0 mesons

b) π^- mesons

c) π^+ mesons

d) all $\pi^0 \pi^- \pi^+$ mesons



Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

B.SC. III SEMESTER V
Subject: Quantum mechanics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

- (1) The concept of matter wave was suggested by _____
(a) Heisenberg (b) de Broglie (c) Schrodinger (d) Laplace
- (2) The intensity of the diffraction pattern is proportional to _____ of the wave function
(a) fourth power (b) cube (c) sixth power (d) square
- (3) The function representing matter waves must be _____
(a) complex (b) real (c) zero (d) infinity
- (4) The total probability of finding the particle in space must be _____
(a) zero (b) unity (c) infinity (d) double
- (5) The normalized wave function must have _____ norm
(a) infinite (b) zero (c) finite (d) complex
- (6) The Non-normalized wave function must have _____ norm
(a) infinite (b) zero (c) finite (d) complex
- (7) For normalized wave function $\psi \rightarrow 0$ as $r \rightarrow \infty$
(a) 0 (b) 1 (c) ∞ (d) -1
- (8) The square of the magnitude of the wave function is called _____
(a) current density (b) probability density (c) zero density (d) volume density
- (9) The operator ∇^2 is called _____ operator
(a) Hamiltonian (b) Laplacian (c) Poisson (d) vector
- (10) _____ principle states that the actual path taken by the light ray is one which minimizes the integral
a) Heisenberg (b) Hamilton's (c) Maupertuis' (d) Fermat's



- (11) The concept of matter wave was suggested by _____
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18
20

Vivekananda College Kolhapur (Autonomous).
Department of Physics: Internal examination 2021-22

Roll No - 7762

B.SC. III SEMESTER V
Subject: Quantum mechanics

Marks: 20 (Each question carry one mark)

Time : 20 min

Q: Select correct alternative.

(1) The concept of matter wave was suggested by _____

(a) Heisenberg (b) de Broglie (c) Schrodinger (d) Laplace

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