

SRI CHAITANYA EDUCATIONAL INSTITUTIONS, INDIA.

a. p, telangana, karnataka, tamilnadu, maharashtra, delhi, ranchi, chandigarha, barnataka, tamilnadu, maharashtra, delhi, ranchi, ranchi, chandigarha, barnataka, tamilnadu, maharashtra, delhi, ranchi, ranch

SEC: SR AIIMS S60 SUB: BOTANY

NEET GRAND TEST - 4

DATE : 23-01-2020 Max. Marks : 720

IMPORTANT INSTRUCTIONS:

Pattern of the Entrance Examination:-

Paper containing 180 objective type questions ,from Biology, Physics and Chemistry

Use Blue/Black Ball Point Pen only to darken the appropriate circle. Answers marked with pencil would not be evaluated.

Each item carries 4marks. For each correct response the candidate will get 4 marks. For each incorrect response 1mark will be deducted from the total score

- 01. NBRI is located in
 - (1) New Delhi
 - (2) Lucknow
 - (3) Kolkata
 - (4) Simla
- 02. How many of the following are found in *Euglena* ?

70s Ribosomes ; cell wall ; plastids ;

80s Ribosomes ; mitochondria

- (1) 5
- (2) 3
- (3) 2
- (4) 4
- 03. Identify the following



- (1) Rhizopus
- (2) Mucor
- (3) Aspergillus

- (4) Trichoderma
- 04. Statement-I : Conducting tissues are absent in the gametophytes of spermatophytes.
 Statement-II : Archegoniatae includes Bryophyta, Pteriodophyta and Gymnosperms.
 - (1) Both Statement I and Statement II are correct
 - (2) Statement I is correct, Statement II is wrong
 - (3) Statement I is wrong, Statement II is correct
 - (4) Both Statement I and Statement II are wrong
- 05. Identify the mismatch
 - (1) Alstonia Whorled phyllotaxy
 - (2) Banana Sucker
 - (3) Jasmine Stolon
 - (4) Pineapple Rhizome
- 06. The United Nations Climate Change Conference (Conference of the Parties, COP) in the year 2019 was held at:
 - (1) Glasgow, UK
 - (2) Madrid, Spain
 - (3) Geneva, Switzerland
 - (4) Kyoto, Japan

- 07. The government of India has initiated stringent norms for automobile fuels for the reduction in _____ and ____ in petrol and diesel:
 (1) Solution for automobile fuels for the formation of the formation of
 - (1) Sulphur; aromatic content
 - (2) CO_2 ; phosphine
 - (3) Lead; CH_4
 - (4) Aromatic content; CO_2
- 08. Mass of living matter at a trophic level in an area at any time is called
 - (1) Standing state
 - (2) Standing crop
 - (3) Detritus
 - (4) Humus
- 09. Identify the correct type of food chain:
 rotting vegetable matter → dung fly →
 common frog → snake
 - (1) Decomposer food chain
 - (2) Detritus food chain
 - (3) Grazing food chain
 - (4) Predator food chain
- 10. The extinction of the passenger pigeon was mostly due to:
 - (1) Increased number of predatory birds
 - (2) Over exploitation by humans
 - (3) Non-availability of food
 - (4) Bird flu virus infection
- 11. Polyadelphous stamens are found in
 - (1) Citrus
 - (2) Pisum
 - (3) Hibiscus
 - (4) Helianthus
- 12. Identify the incorrect statement
 - (1) Radial vascular bundles are closed
 - (2) Conjoint collateral vascular bundles are

either open or closed

- (3) Vascular bundles are closed in dicot stems
- (4) Xylem and phloem are arranged in alternate manner on different radii in radial vascular bundles
- 13. Complete secondary lateral meristem is
 - (1) Cork cambium in Dicot stem
 - (2) Vascular cambium in Dicot root
 - (3) Cork cambium in Dicot root
 - (4) All the above
- 14. The following is not related to SER
 - (1) Protein synthesis
 - (2) Lipid synthesis
 - (3) Synthesis of steroidal hormones in a cells
 - (4) Transport of substances
- 15. Pigments are completely absent in
 - (1) Amyloplasts
 - (2) Elaioplasts
 - (3) Aleuroplasts
 - (4) All the above
- 16. Which of the following is not used for construction of ecological pyramids?
 - (1) Fresh weight
 - (2) Dry weight
 - (3) Number of individuals
 - (4) Rate of energy flow
- 17. Two opposing forces operate in growth and development of every population. One of them is the ability to reproduce at a given rate. The opposing force is:
 - (1) Morbidity
 - (2) Fecundity
 - (3) Biotic potential
 - (4) Environmental resistance

- Measuring Biochemical Oxygen Demand (BOD) is a method used for
 - (1) Measuring the activity of *Saccharomyces cerevisiae* in producing curd on a commercial scale
 - Working out the efficiency of R.B.Cs. about their capacity to carry oxygen
 - (3) Estimating the amount of organic matter in sewage water
 - (4) Working out the efficiency of oil driven automobile engines
- Arrange the steps of ADA deficiency treatment in sequence:
 - I. The lymphocytes with ADA cDNA are returned to the patient
 - II. The lymphocytes from the blood of the patient are grown in culture outside the body
 - III. A functional ADA cDNA (using retroviral vector) is introduced into the lymphocytes
 - $(1) \quad II \to III \to I$
 - $(2) \quad I \to II \to III$
 - $(3) \quad II \to I \to III$
 - $(4) \quad III \to II \to I$
- 20. Outbreeding is an important strategy of animal husbandry because it:
 - (1) is useful in overcoming inbreeding depression
 - (2) is useful in producing pure-lines of animals
 - (3) helps is accumulation of superior genes

- (4) exposes harmful recessive genes that are eliminated by selection
- 21. Identify A and B respectively



- (1) Central sheath, Inter doublet bridge
- (2) Central microtubule, radial spoke
- (3) Radial spoke, Central microtubule
- (4) Central sheath, Radial spoke

22. Identify the following structure



- (1) Adenosine
- (2) Deoxy adenylic acid
- (3) Adenylic acid
- (4) ADP
- 23. Identify the correct match

	L1st-I		L1St-11							
A) (Curcun	nin	I) Glucose transporter							
B) (Concan	avalin A	II) D	II) Drug						
C) (Glut – 4	4	III) T	III) Toxin						
D) l	Ricin		IV) Lectin							
	А	В	С	D						
(1)	II	IV	III	Ι						
(2)	IV	Ι	III	II						
(3)	Π	IV	Ι	III						
(4)	IV	Ι	II	III						

Sri Chaitanya

 $\begin{array}{ccc} X & Y \\ | & | \\ C - C \rightarrow X - Y + C = C \end{array}$ The enzyme which catalyse the above reaction belongs to the following class

- (1) Lyases
- (2) Hydrolases
- (3) Transferases
- (4) Ligases
- 25. Identify the following stage



- (1) Metaphase
- (2) Metaphase I
- (3) Anaphase
- (4) Transition to metaphase
- 26. HIV targets include all of the following except:
 - (1) Helper T cells
 - (2) Macrophages
 - (3) Cells bearing CD4
 - (4) Cytotoxic T- cells
- 27. The prevalence of dark-coloured moths in industrially polluted areas where they are better camouflaged than the paler forms (industrial melanism) is an example of :
 - (1) Disruptive selection
 - (2) Stabilising selection
 - (3) Directional selection
 - (4) Balanced polymorphism
- Sri Chaitanya

- 28. Example of a homologous organ / structure are
 - (1) The arm of a human, wing of a bird
 - (2) Wing of an insect, wing of a bird
 - (3) Leg of a dog, leg of a spider
 - (4) Potato and radish
- 29. Choose the incorrect match *w.r.t.* HGP:
 - (1) 'Expressed Sequence Tags' → used to identify gene transcripts (m-RNA), and are instrumental in gene discovery
 - (2) 'Sequence Annotation' → sequencing both coding and non-coding sequences then marking specific regions with descriptive information about structure or function.
 - (3) YAC and BAC \rightarrow Cloning vectors
 - (4) Human X chromosome → The last chromosome to be sequenced
- 30. What is the relationship between the child-1 and parents?



- (1) Biological to only mom
- (2) Biological to only dad
- (3) Biological to both
- (4) Biological to neither

- 31. Identify the correct statement
 - (1) Diakinesis represents transition to Metaphase-I
 - (2) Terminalization occurs in diplotene
 - (3) Synapsis occurs in pachytene
 - (4) Seggregation chromosomes occur in Anaphase-II
- 32. The following is incorrect regarding pure water in a beaker at atmospheric pressure.
 - (1) $\Psi_w = O$
 - (2) $\Psi_S = \text{Less than O}$
 - (3) $\Psi \pi = O$
 - (4) $\Psi p = O$
- Essential element needed for the formation of mitotic spindle is
 - (1) Calcium
 - (2) Sulphur
 - (3) Iron
 - (4) Potassium
- 34. Proteins can enter the respiratory pathway in the form of
 - (1) Pyruvate
 - (2) Acetyl CoA
 - (3) Some stage within the Kreb's cycle
 - (4) All the above
- 35. Formation of secondary cortex during secondary growth is example for
 - (1) Dedifferentiation
 - (2) Redifferentiation
 - (3) Differentiation
 - (4) Plasticity
- A widely accepted method of contraception in India is
 - (1) IUDs

- (2) Diaphragms
- (3) Tubectomy
- (4) Cervical caps
- 37. Correct statement *w.r.t.* Medical termination of pregnancy is:
 - MTP is essential in certain cases where continuation of the pregnancy could be fatal either to the mother or to the foetus or both
 - (2) MTP is most unsafe during the first trimester of pregnancy
 - (3) MTP is quite safe even if performed in the third trimester, provided it is performed by a trained obstetrician
 - (4) MTP Act (1971) bans every type of terminations of pregnancy in India.
- 38. Which of the following produces the male sex hormone?
 - (1) Rete testis
 - (2) Seminiferous tubule
 - (3) Leydig cell
 - (4) Scrotum
- 39. If the menstrual cycle is of 32 days, then ovulation would occur on the:
 - (1) $14^{th} day$
 - (2) $18^{\text{th}} \text{day}$
 - $(3) \quad 28^{th} day$
 - (4) 5^{th}day

40. Which of the following is not an effect of stimulation of sympathetic nervous system?

- (1) Dilation of pupil
- (2) Inhibition of peristalsis
- (3) Elevation of blood pressure
- (4) Stimulation for saliva secretion

41.	The first stable compound in C_4 pathway i	5	(4) Ovary
	formed in	46.	During generation of a nerve impulse, the
	(1) Chloroplast of mesophyll cells		Action Potential results from the movement
	(2) Chloroplast of Bundle sheath cells		of:
	(3) Cytosol of mesophyll cells		(1) K^+ ions from intracellular fluid to
	(4) Cytosol of Bundle sheath cells		extracellular fluid
42.	Clear cut vegetative, reproductive and	1	(2) Na^+ ions from extracellular fluid to
	senescent phases are seen in		intracellular fluid
	(1) Cycas		(3) K^+ ions from extracellular fluid to
	(2) Pinus		intracellular fluid
	(3) Ficus		(4) Na^+ ions from intracellular fluid to
	(4) Oryza		extracellular fluid
43.	Identify the odd one based on the type o	f 47.	Corneal transplantation is generally successful
	fusing gametes		in humans as:
	(1) Fucus		(1) cornea lacks blood supply
	(2) Cladophora		(2) it is a transparent membrane
	(3) Cycas		(3) it lacks nerve fibres
	(4) Pinus		(4) it is a dead structure
44.	Statement-I : Gametes are always formed by	48.	Choose the incorrect match:
	Meiosis.		(1) Myopia – short sightedness
	Statement-II : Gametes are Haploid.		(2) Hypermetropia - Can be corrected by
	(1) Both Statement I and Statement II are	e	using concave lens
	correct		(3) Cataract – Opaque lens
	(2) Statement I is correct, Statement II i	5	(4) Glaucoma – increased intraocular
	wrong		pressure
	(3) Statement I is wrong, Statement II i	⁵ 49.	Which of the following is correct for 'pars
	correct		nervosa'?
	(4) Both Statement I and Statement II are	e	(1) It stocks and releases hormones
	wrong		synthesised by hypothalamus
45.	If anther is microsporophyll, then embryosa	2	(2) It synthesises many hormones of its own
	is		(3) It is present in childhood but gets
	(1) Female gamete		atrophied in adults
	(2) Female gametophyte		(4) It is vestigial in humans
	(3) Ovule		

Hyderabad

50. Name the basic structural and functional unit of the nervous system.

- (1) Neuroglia
- (2) Glial cells
- (3) Neurons
- (4) Perikaryon
- 51. The number of male gametes involved in double fertilization
 - (1) 3
 - (2) 4
 - (3) 2
 - (4) 5
- 52. Pollination is maize is
 - (1) Entomophily
 - (2) Hydrophily
 - (3) Malocophily
 - (4) Anemophily
- 53. Identify the incorrect statement
 - (1) PEN divides to form endosperm tissue after embryogenesis
 - (2) Endosperm development precedes embryo development
 - (3) Monocot seeds are generally endospermic
 - (4) Cells of Aleurone layer are triploid

54. Gametes are

- (1) Always heterozygous
- (2) Always homozygous
- (3) Always hemizygous
- (4) Always diploid
- 55. Pea plant having Bb genotype shows complete dominance for
 - (1) Shape of starch grain

Sri Chaitanya

(2) Size of starch grain

- (3) Size of the seed
- (4) Shape of the seed
- 56. Calculation, contemplation and cognition are human activities associated with increased activity in the:
 - (1) Cerebrum
 - (2) Cerebellum
 - (3) Spinal cord
 - (4) Pituitary gland
- 57. Read the statements regarding muscle proteins:
 - I. Each F-actin strand is composed of a string of subunits called globular (G) actin
 - II. Regulatory protein troponin is distributed at regular intervals on myosin filaments
 - III. Myosin is a thick filament which is also a polymerized protein
 - IV. The globular head of meromyosin consists of light meromyosin (LMM)

Which of the above statements are correct?

- (1) I, II and III
- (2) I, II and IV
- (3) I and III
- (4) II and IV
- 58. The most freely movable joint of all synovial joints is:
 - (1) Ball and socket joint
 - (2) Hinge joint
 - (3) Pivot joint
 - (4) Gliding joint

59.	Mot	or neurons electrically stimulate nearby								
	muscle fibres at									
	(1)	Creatine phosphate	6							
	(2)	Actin filament								
	(3)	Neuromuscular junction								
	(4)	Cross-bridges								
60.	Whi	ch of the following statements is correct								
	about excretion?									
	(1)	Humans excrete 25-30 grams of urea per	Ū							
		day								

- (2) Glucose and amino acid are reabsorbed passively in renal tubules
- (3) Descending limb of loop of Henle is impermeable to water
- (4) Kidneys reabsorb about 30% volume of glomerular filtrate
- 61. Identify the incorrect statement regarding genetic material of $\phi x 174$ bacteriophage
 - (1) It is a polymer having ribose sugars
 - (2) Chargaff rule is not applicable to it
 - (3) It contains adenine, guanine, thymine, cytosine
 - (4) Two successive nucleotides are linked by phosphodiester bonds
- 62. Identify the incorrect statement regarding genetic code
 - (1) Code is degenerate
 - (2) Code is nearly universal
 - (3) Code is unambiguous and specific
 - (4) UUU codes for glycine
- 63. In prokaryotes, predominant site for control of gene expression is
 - (1) Elongation step
 - (2) Termination step

- (3) Processing of hn RNA
- (4) Initiation step of transcription
- 64. Corn borer is controlled by the following gene
 - (1) cry II Ab
 - (2) cry IAc
 - (3) cry II Ac
 - (4) cry I Ab
- 65. Total number of ATP's formed by all reduced coenzymes during oxidation of one glucose molecule
 - (1) 38
 - (2) 40
 - (3) 34
 - (4) 36
- 66. Dialysing unit (artificial kidney) contains a fluid which is almost same as blood plasma, except that it has:
 - (1) High levels of glucose
 - (2) High levels of urea
 - (3) No nitrogenous wastes
 - (4) High levels of creatinine
- 67. Within a normally functioning kidney, blood can be found in:
 - (1) the lumen of renal pelvis
 - (2) the vasa recta
 - (3) the Henle's loop
 - (4) the collecting ducts
- 68. Which of the following is devoid of muscle layer?
 - (1) Capillaries
 - (2) Arterioles
 - (3) Veins
 - (4) Arteries

- 69. The white fibres are chemically formed of
 - (1) Actin
 - (2) Collagen
 - (3) Myosin
 - (4) Elastin
- 70. Which of the following granulocytes arrive at the earliest at the site of infection?
 - (1) Eosinophils
 - (2) Basophils
 - (3) Neutrophils
 - (4) Monocytes
- 71. While isolating DNA from bacteria, which of the following enzymes is not used ?
 - (1) Lysozyme
 - (2) Ribonuclease
 - (3) Protease
 - (4) Deoxyribonuclease
- 72. In RNAi, mRNA is silenced using
 - (1) ssDNA
 - (2) dsDNA
 - (3) dsRNA
 - (4) ssRNA
- 73. Which of the following step in PCR is catalysed by Taq polymerase ?
 - (1) Denaturation of template DNA
 - (2) Annealing of primers to DNA templates
 - (3) Primer extension on template DNA
 - (4) All of these
- 74. Sonalika is a variety of
 - (1) Wheat
 - (2) Rice
 - (3) Millet
 - (4) Tobacco
- 75. Black rot of crucifers is caused by
 - (1) Bacteria
- Sri Chaitanya

- (2) Fungi
- (3) Nematode
- (4) Virus
- 76. A healthy human has, on an average, _____ million RBCs per mm^3 of blood.
 - (1) 3 3.5 billion
 - (2) 2 2.5 million
 - (3) 5 5.5 million
 - (4) 6000 8000
- 77. The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the options given below, the one-part A, B, C or D is correctly identified along with its function?



- B : Red blood cell transport of CO₂ only
- 2) C : Arterial capillary passes oxygen to tissues
- A : alveolar cavity main site of exchange of respiratory gases
- 4) D : Capillary wall exchange of O₂ and CO₂ takes place here
- 78. The micelle formation is generally not needed for the absorption of:
 - (1) Fatty acids
 - (2) Vitamins A, D, E & K
 - (3) Glycerol
 - (4) Amino acids

79.	Brus	sh boro	der colum	nnar ep	ithelium is	the		(3)	iv	iii	ii	i						
	linir	ng of:						(4)	iv	i	iii	ii						
	(1)	Oesop	hagus				84.	Which one of the following alcoholic dri										
	(2)	Small	intestine				is produced without distillation ?											
	(3)	Stoma	ich					(1)	Wine									
	(4)	Proxir	nal convol	uted tub	oules			(2)	Whisk	у								
80.	The	functio	on of typh	losole i	n earthworm	ns is		(3) Rum										
	to:							(4)	Brand	у								
	(1)	Secret	e digestive	e juice			85.	Whi	ch one	of the	follo	wing statemen	ts is					
	(2)	Regula	ate the blo	od flow				corr	ect for s	secondary	y succ	ession?						
	(3)	Emuls	ify the fat	ty foods				(1)	It occu	irs on a d	efore	sted site						
	(4)	Increa	se absorj	otive s	urface area	of		(2)	It begi	ns on a b	are ro	ock						
		intesti	nes					(3)	It is	similar	to	primary succes	ssion					
81.	Nort	th India	n sugar va	riety is					excep	t that it i	s rela	atively slow						
	(1)	S. offi	cinarum					(4)	ited pond									
	(2)	S. barl	beri				86.	Malpighian tubules in cockroaches:										
	(3)	Co 78	5					(1) Are attached to gizzard										
	(4)	Kalya	nsona					(2)	Conve	rt nitrog	genou	s wastes into	uric					
82.	Met	hanoger	nic bacteri	a are no	t found in				acid									
	(1)	rumen	of cattle					(3)	(3) Lie at the junction of foregut and midg									
	(2)	gobar	gas plant					(4)	(4) Remain isolated from haemolymph									
	(3)	botton	n of water-	logged	paddy fields		87.	Mat	ch the c	olumns:								
	(4)	activa	ted sludge						Colu	mn – I		Column - II						
83.	Mat	ch the t	following	list of b	acteria and t	their	-	A.	Hyalir	ie	i)	Intervertebral						
	com	mercial	lly importa	int produ	ucts				cartila	ge		disc and put	oic					
		Bacter	rium	Pr	oduct							symphysis						
	A) A	Aspergil	llus niger	i) Lac	tic acid			B.	White	-fibrous	ii)	Tip of nose						
	B) A	lcetoba	cter aceti	ii) Bu	tyric acid				cartila	ge								
	C) (Clostrid	ium	iii) Ac	etic acid			C.	Elastic	;	iii)	Foetal skeletor	1					
	b	outylicu	т						cartila	ge								
	D) <i>I</i>	Lactoba	cillus	iv) Ci	tric acid		L	(1)	A = (ii	i), B = (i	i), C :	= (i)]					
	Cho	ose the	correct ma	atch				(2) $A = (ii), B = (iii), C = (i)$										
		А	В	С	D			(3) $A = (iii), B = (i), C = (ii)$										
	(1)	ii	iii	iv	i			(4)	A = (i)), B = (ii)	, C =	(iii)						
- -	(2)	ii · ·	iv	iii	i													
Sri	Cha:	ıtanya	L			Pag 10	e					Hyder	apad					

88.	True	about	Ascidia,	Branchi	ostoma,
	Doli	olum, Salpa	is		
	(1)	All are	non-cho	ordates	except
		Branchiost	ота		
	(2)	All are	urocho	ordates	except
		Branchiost	ота		
	(3)	All are cho	rdates excep	t Branchie	ostoma
	(4)	All are	protocho	ordates	except
		Branchiost	ота		
89.	Whic	ch among th	ese is the co	rrect comb	oination
	of aq	uatic mamm	nals?		
	(1)	Seals, Dolp	hins, Sharks		
	(2)	Dolphins, S	eals, Trygon	1	
	(3)	Whales, Do	lphins, Seals	S	
	(4)	Trygon, Wł	ales, Seals		
90.	Mea	<i>ndrina</i> is:			
	(1)	the Brain c	oral		
	(2)	an arthropo	od		
	(3)	the sea ane	mone		
	(4)	a hemichor	date		
91.	The	following a	diagram ind	icates the	energy
	level	ls of a cert	ain atom, v	where the	system
	mov	es from 41	E level to	E, a pho	oton of
	wave	elength λ_1 i	s emitted. T	The wavele	ength of
	phot	on produc	ed during	its tra	ansition
	from	$\frac{7}{3}E$ level to	o E is λ_2 .	The ratio -	$\frac{\lambda_1}{\lambda_2}$ will
	be				
		\downarrow	Ţ	4E <u>7</u> E 3	
	(1)	$\frac{9}{4}$			

4

Sri Chaitanya

- 92. All electron ejected from a surface by incident of wavelength 200 nm can be stopped before travelling 1 meter in the direction of a uniform electric field of $4 NC^{-1}$ the work function of the surface is
 - (1) 4 eV

 $\frac{4}{9}$

 $\frac{3}{2}$

(4) $\frac{7}{3}$

(2)

(3)

- (2) 5.2 eV
- (3) 3 eV
- (4) 2.2 eV
- 93. The de Broglie wavelength of an electron moving with a velocity $1.5 \times 10^8 m/s$ is equal to that of a photon. The ratio of the kinetic energy of the electron to the energy of the photon is
 - (1) $\frac{1}{4}$ (2) $\frac{1}{2}$ (3) 2
 - (4) 4

94. A heavy nucleus at rest breaks into two fragments which fly off with velocities in the ratio 27:1. The ratio of radii of the fragments is

(1) 1:
$$3\sqrt{3}$$

- (2) $\sqrt{3}:1$
- (3) 1:3

Page

(4) $3\sqrt{3}:1$

95. Figure shows the transfer characteristics of a base biased CE transistor. Which of the following statements is FALSE?



- (1) At $V_i = 1V$, it can be used as an amplifier
- (2) At $V_i = 0.5V$, it can be used as a switch turned off.
- (3) At $V_i = 2.5V$, it can be used as a switch turned on
- (4) At $V_i = 0.4V$, transistor is in active state
- 96. To produce high output (1) at R, we must have input x and y respectively



- (1) x = 0, y = 1
- (2) x = 1, y = 1
- (3) x = 1, y = 0
- (4) x = 0, y = 0
- 97. The breakdown in a reverse biased p-n junction diode is more likely to occur due to
 - (a) large velocity of the minority charge carriers if the doping concentration is small
 - (b) large velocity of the minority charge carriers if the doping concentration is large

- (c) strong electric filed in the depletion region if the doping concentration is small
- (d) strong electric filed in the depletion region if the doping concentration is large
- (1) a, d
- (2) c only
- (3) b only
- (4) b, c
- 98. From the figure shown here, establish a relation between μ_1 , μ_2 and μ_3



- (1) $\mu_1 < \mu_2 < \mu_3$
- (2) $\mu_3 < \mu_2; \ \mu_3 = \mu_1$

(3)
$$\mu_3 > \mu_2; \ \mu_3 = \mu_1$$

- (4) $\mu_1 > \mu_2 > \mu_3$
- 99. One face of a prism with a refractive angle of 30^{0} is coated with silver. A ray incident on another face at an angle of 45^{0} is refracted at first surface, reflected from the silver coated face and retraces its path. What is the refractive index of the prism?





(4)

Sri Chaitanya

- 100. The magnifying power of an astronomical telescope in the normal adjustment position is100. The distance between the objective and the eye piece is 101 cm. Find the focal length of the objective lens
 - (1) 1 cm
 - (2) 100 cm
 - (3) 50 cm
 - (4) 51 cm
- 101. In young's double slit experiment with pin holes, the interference pattern on the screen, placed perpendicular to line of pin holes, is
 - (1) Parabolic
 - (2) Straight
 - (3) Hyperbolic
 - (4) Circular
- 102. A screen is place 50 cm from a single slit,

which is illuminated with 6000 A light. If the distance between the first and third minima in the diffraction pattern is 3 mm, the width of the slit is

- (1) 0.1 mm
- (2) 0.2 mm
- (3) 0.3 mm
- (4) 0.4 mm
- 103. Two wires of resistances R_1 and R_2 have temperature coefficient of resistance α_1 and α_2 respectively. These are joined in series the effective temperature coefficient of resistance is
 - (1) $\frac{\alpha_1 + \alpha_2}{2}$ (2) $\sqrt{\alpha_1 \alpha_2}$

(3)
$$\frac{\alpha_{1}R_{1} + \alpha_{2}R_{2}}{R_{1} + R_{2}}$$

(4)
$$\frac{\sqrt{R_{1}R_{2}\alpha_{1}\alpha_{2}}}{\sqrt{R_{1}^{2} + R_{2}^{2}}}$$

- 104. A potentiometer wire has length 4m and resistance 6Ω . The resistance that must be connected in series with the wire and a battery of emf 4V so as to get a potential gradient 5mV per cm on the wire is
 - 6Ω
 - (2) 12Ω
 - (3) 18Ω
 - (4) 24Ω
- 105. If a number of forces act on a body and the body is in static or dynamic equilibrium, then
 - Work done by any individual force must be zero
 - (2) Net work done by all the forces is +ve
 - (3) Net work done by all the forces is -ve
 - (4) Net work done by all the forces is zero
- 106. The velocities of two particles A and B of same mass are $\vec{V}_A = a\hat{i}$ and $\vec{V}_B = b\hat{i}$ where a and b are constants. The acceleration of particle A is $(2a\hat{i} + 4b\hat{i})$ and acceleration of particle B is $(a\hat{i} - b\hat{i})$ (in m/s^2). The path of the centre of mass of two particles is
 - (1) Straight line
 - (2) Parabola
 - (3) Ellipse
 - (4) Circle

107. A small object of mass m starts from rest at the position shown and slides along the frictionless loop-the-loop track of radius R. What is the smallest value of y such that the object will slide without losing contact with the track?



(3) $\frac{R}{4}$ (4) $\frac{3R}{4}$

108. The frequency of vibration of a string is given

by $v = \frac{P}{2l} \left[\frac{F}{m} \right]^{1/2}$ here p is the number of

segments in which the string is divided, F is the tension in the string and l is its length. The dimensional formula for m is

- (1) $\begin{bmatrix} M^0 L^0 T^0 \end{bmatrix}$ (2) $\begin{bmatrix} M L^{-1} T^0 \end{bmatrix}$ (3) $\begin{bmatrix} M L^0 T^{-1} \end{bmatrix}$ (4) $\begin{bmatrix} M^0 L T^{-1} \end{bmatrix}$
- 109. An object moving with a speed of 6.25 m/s, is retarded by $2.5\sqrt{v}$. Where v is instantaneous speed. The time taken by the object to come to rest, would be
 - (1) 1 s
- Sri Chaitanya

- (2) 2 s
- (3) 4 s
- (4) 8 s
- 110. A fixed pulley of radius 20 cm and moment of inertia $0.32 kg.m^2$ about its axle has a massless cord wrapped around its rim. A mass M of 2 kg is attached to the end of the cord. The pulley can rotate about its axis without any friction. The acceleration of the mass M is (Assume $g = 10m/s^2$)



(1)
$$1m/s^2$$

- (2) $3m/s^2$
- (3) $2m/s^2$
- (4) $4m/s^2$
- 111. A particle thrown at an angle of 30° with the horizontal has a range R_1 and maximum vertical height H_1 . The another particle with double the mass when thrown from the same point with the same velocity at an angle of 30° with the vertical has a range R_2 and maximum vertical height H_2 . Choose the correct relation

(1)
$$R_1 = R_2; H_1 = 3H_2$$

(2)
$$R_1 = R_2; H_1 = \frac{H_2}{3}$$

(3)
$$R_1 = \frac{R_2}{3}; H_1 = H_2$$

(4)
$$R_1 = 3R_2; H_1 = H_2$$

112. The system is pushed by a force F as shown in figure. All surfaces are smooth except between B and C. Friction coefficient between B and C is μ . Minimum value of F to prevent block B from downward slipping is



113. A boy is hanging over a pulley inside a car through a string. The second end of the straight is in the hand of a person standing in the car. The car is moving with constant acceleration 'a' directed horizontally as shown in figure. Other end of the straight is pulled with constant acceleration 'a' (relative to car) vertically. The tension in the string is equal to



(4) m(g+a)

- 114. A ballet dancer spins about a vertical axis at 60 rpm with his arms closed. Now he stretches his arms such that M.I increases by 50%. The new speed of revolution is.
 - (1) 80 rpm
 - (2) 40 rpm
 - (3) 90 rpm
 - (4) 30 rpm
- 115. The escape velocity from a planet is v_e . A tunnel is dug along the diameter of the planet and a small body dropped into it. The speed of the body at the centre of the planet will be

(1)
$$\frac{v_e}{\sqrt{2}}$$

(2)
$$\frac{v_e}{2}$$

(3)
$$v_e$$

(4)
$$2v_e$$

- 116. The height at which the weight of a body becomes 1/9th its weight on the surface of earth (radius of earth is R)
 - (1) h = 3 R
 - (2) h = R

$$(3) \quad h = \frac{R}{2}$$

- $(4) \quad h = 2R$
- 117. Steam at $100^{\circ}C$ is passed into 22g of water at $20^{\circ}C$. The mass of water that will be present when the water acquires a temperature of $90^{\circ}C$ (Latent heat of steam is 540 cal/g) is
 - (1) 24.8 g
 - (2) 24 g
 - (3) 36.6 g
 - (4) 2.8 g

- 118. A gaseous mixture consists of 16 g of helium | 121. A refrigerator placed in a room at 300 K has and 16 g of oxygen. The ratio $\left(C_p / C_v\right)$ of the mixture is
 - (1) 1.4
 - (2)1.54
 - (3) 1.59
 - (4) 1.62
- 119. A black body has maximum wavelength λ_m at 2000 K. Its corresponding wavelength at 3000 K will be

(1)
$$\frac{16}{81}\lambda_m$$

(2) $\frac{81}{16}\lambda_m$
(3) $\frac{3}{2}\lambda_m$

- (4) $\frac{2}{3}\lambda_m$
- 120. The P-V diagram of 2g of helium gas for a certain process $A \rightarrow B$ is shown in the figure. What is the work done by the gas during the process $A \rightarrow B$?



- (2) $6P_0V_0$
- (3) $4.5P_0V_0$
- (4) $2P_0V_0$

- inside temperature 200 K. How many calories of heat shall be delivered to the room for each 2 Kcal of energy consumed by the refrigerator ideally?
 - (1) 4 Kcal
 - (2) 2 Kcal
 - (3) 8 Kcal
 - (4) 6 Kcal
- 122. When the stress is numerically equal to half of the young's modulus, the final length of the wire if the initial length is L
 - (1) 3 L
 - (2) 2 L
 - (3) 1.5 L
 - (4) 4.5 L
- 123. When a ball is released from rest in a very long column of viscous liquid, its downward acceleration is 'a' (just after release). Then its acceleration when it has acquired two third of the maximum velocity

(1)
$$\frac{a}{3}$$

(3) $\frac{2a}{3}$
(3) $\frac{a}{6}$
(4) $\frac{2a}{5}$

124. The potential energy of a particle of mass 1 kg in motion along the x-axis is given by $U = 4 (1 - \cos 2x) J$ Here : x is in metres. The period of small oscillations (in sec) is

 2π (1) (2) π π

$$(3) \quad \frac{\pi}{2}$$

$$(4) \quad \sqrt{2}x$$

Sri Chaitanya

125. A string clamped at both ends is vibrating. At 12

the moment the string looks flat, the instantaneous transverse velocity of points along the string, excluding its end-points, must be

- (1) zero everywhere
- (2) dependent on the location along the string
- (3) non zero everywhere
- (4) non zero and in the same direction everywhere
- 126. An air craft moving horizontally at an altitude with a speed equal to half of velocity of sound, produces a sound of frequency 3K Hz. What is apparent frequency heard by an observer on the ground at the instant when the air craft is moving over the head of him
 - (1) 2.1K Hz
 - (2) 3 K Hz
 - (3) 3.5 K Hz
 - (4) 4 K Hz
- 127. A long solenoid has 1000 turns per metre and carries a current of 1 a. It has a soft iron core of $\mu_r = 1000$. The core is heated beyond the Curie temperature, T_c .
 - The H field in the solenoid is (nearly) unchanged but the B field decreases drastically
 - (2) The H and B fields in the solenoid are nearly unchanged
 - (3) The magnetisation in the core reverses direction
 - (4) The magnetisation in the core diminishes by a factor of about 10

128.



When S_1 is closed and S_2 is open $V_L = V_R = V_C = 10V$. What will be the value of V_C if S_1 opened and S_2 is closed? (1) 10

(2)
$$10\sqrt{2}$$

(3)
$$\frac{10}{\sqrt{2}}$$

(4) $15\sqrt{2}$

- 129. A conducting circular loop of radius a and resistance R is kept on horizontal plane. A vertical time varying magnetic field B = 2t is switched on at time t = 0. Then
 - (1) power generated in the coil at any time is constant
 - (2) flow of charge per unit time from any section of the coil is constant
 - (3) total charge passed through any section $\begin{pmatrix} 4 & 2 \end{pmatrix}$

between time t = 0 to t = 2s, $\left(\frac{4\pi a^2}{R}\right)$

- (4) all of the above
- 130. Consider a non spherical conductor shown in the figure which is given a certain amount of positive charge. The charge distributes itself on the surface such that the charge densities are σ_1 , σ_2 and σ_3 at the region 1, 2 and 3 respectively. Then



Sri Chaitanya

- 131. Two equal point charges q are fixed at x = a and x = + a on x-axis. Another point charge Q is placed at the origin. The change in electrical potential energy of Q, when it is displaced by a small amount x along x-axis, is approximately proportional to
 - (1) x
 - (2) x^2
 - (3) x^{3}
 - (4) $\frac{1}{x}$
- 132. The average electric field of electromagnetic waves in certain region of free space is $9 \times 10^{-4} NC^{-1}$. Then, the average magnetic field in the same region is of the order of
 - (1) $27 \times 10^{-4} T$
 - (2) $3 \times 10^{-12} T$
 - $(3) \quad \left(\frac{1}{3}\right) \times 10^{-12} T$
 - (4) $3 \times 10^{12} T$
- 133. A parallel plate capacitor is charged from a cell then isolated from it. The separation between it's plates is now increased then the force of attraction between the plates
 - (1) will decrease
 - (2) will increase
 - (3) will increase or decrease depending on charge
 - (4) will remains same
- 134. The graph showing the variation of the magnetic field strength (B) with distance (r) from a long current carrying conductor is



- 135. The instantaneous acceleration of an electron in a magnetic field $\overline{B} = 2\overline{i} + 3\overline{j} + 4\overline{k}$ is $\overline{a} = x\overline{i} + \overline{j} - \overline{k}$. The magnitude of acceleration is
 - (1) 0.5 units
 - (2) 1.5 units
 - (3) $\sqrt{0.5}$ units
 - (4) $\sqrt{2.5}$ units
- 136. Total number of nodes, the planar nodes and the radial nodes in case of 4f orbital respectively are
 - 4,3,2
 3,3,0
 3,2,1
 - (4) 4,2,1

- 137. A gaseous compound of nitrogen and hydrogen contains 12.5% (by mass) of hydrogen. The density of the compound relative to that of hydrogen is 16. The molecular formula of the compound is
 - (1) N_2H
 - (2) NH₂
 - (3) N_2H_4
 - (4) N₂H₆
- 138. Equal volumes of two solutions with pH values 2 & 6 are mixed together. pH of resulting solution is:
 - (1) 4
 - (2) 6.3
 - (3) 2.3
 - (4) 7
- 139. Which of the given statements incorrect
 - (1) Keratin & Myosin are fibrous proteins
 - (2) Deficiency of vitamin C causes scurvy
 - (3) Nucleoside contains pentose sugar +Purine or pyrimidine base + phosphate
 - (4) Glucosazone formation from glucose requires 3 moles of phenyl hydrazine
- 140. For a hypothetical reaction, the activation energy is zero. What is the rate constant at 400K if at 300K its value is 2.5×10^5 sec⁻¹?
 - (1) $5.0 \times 10^5 \text{ sec}^{-1}$
 - (2) $1.0 \times 10^5 \text{ sec}^{-1}$
 - (3) $3.0 \times 10^6 \text{ sec}^{-1}$
 - (4) $2.5 \times 10^5 \text{ sec}^{-1}$
- 141. Volume of 98% (w/w) H₂SO₄ of specific gravity 1.8 required to prepare one litre of 1.8M solution is

- (1) 10 ml
- (2) 200 ml
- (3) 100 ml
- (4) 500 ml
- 142. Which of the following can act as both Lewis acid and Lewis base
 - (1) SO₃
 - (2) SF₄
 - (3) CO
 - (4) SiF_6^{-2}
- 143. The solubility product of $Pb(OH)_2$ in water is 8.64 x 10⁻¹⁶ M. The solubility of $Pb(OH)_2$ in a buffer solution of pH= 10 is
 - (1) $3.5 \times 10^{-10} \text{ M}$
 - (2) 8.64 x 10^{-8} M
 - (3) $2.2 \times 10^{-6} M$
 - (4) 8.64 x 10^{-2} M
- 144. $C_2O^{-2} + MnO_4^{-1} \rightarrow Mn^{+2} + CO_2$, this reaction takes place in :
 - (1) Basic medium
 - (2) Neutral medium
 - (3) Acidic medium
 - (4) Strong alkaline medium
- 145. In a reversible reaction $K_C < K_p$ and

 $\Delta H = +40$ K. Cal / mole. Forward reaction is favoured by

- (1) Increasing both pressure & temperature
- (2) Decreasing both pressure & temperature
- (3) Decreasing pressure & increasing temperature
- (4) Increasing pressure & decreasing temperature

Sri Chaitanya

- 146. Oxidation number of potassium in K₂O, K₂O₂ and KO₂, respectively is:
 - (1) +1, +2 and +4
 - (2) +1, +4 and +2
 - (3) +2, +1 and $+\frac{1}{2}$
 - (4) +1, +1 and +1
- 147. Which among the following has highest boiling point?
 - (1) 0.5 M Glucose(aq)
 - (2) 0.5 M NaCl(aq)
 - $(3) \quad 0.5 \text{ M CaCl}_2(aq)$
 - (4) 0.5 M Al₂(SO₄)₃ (aq)
- 148. Given that the standard potential (E°) of Cu^{2+} / Cu and Cu^{+} / Cu are 0.34 V and

0.522 V respectively, the E^o of Cu^{2+} / Cu^{+} is:

- (1) 0.182V
- (2) 0.158V
- (3) 0.182 V
- (4) +0.158 V
- 149. For the reaction $P(l) \rightarrow Q(g)$

 $\Delta U = 2.1 K cal \& \Delta S = 15 cal K^{-1} at 300 K$. Hence ΔG is K cal is:

- (1) 1.8
- (2) 2.1
- (3) 2.5
- (4) 2.9
- 150. The bond order and magnetic characteristics of CN^- are :
 - (1) 3, diamagnetic
 - (2) $2\frac{1}{2}$, diamagnetic

- (3) $2\frac{1}{2}$, paramagnetic
- (4) 3, paramagnetic
- 151. Which among the following is incorrect statement?
 - (1) The refining method used when the metal and the impurities have low and high melting temperatures respectively is liquation
 - (2) Wrought iron is the purest form of iron
 - (3) Zone refining is preferred if impurities are more soluble in molten metal than in solid metal
 - (4) The leaching agent used in the concentration of Bauxite is H_2SO_4
- 152. The flocculation value of HCl for arsenic sulphide sol is 30 milli mol L^{-1} . If H_2SO_4 is used for the flocculation of arsenic sulphide, then the amount in grams of H_2SO_4 required for 500 ml in the above purpose is :
 - (1) 1.65g
 - (2) 0.735g
 - (3) 4.53g
 - (4) 0.35g
- 153. Which among the following is correct statement?
 - Drugs which bind to the active site of enzyme are called allosteric drugs
 - (2) A chemical messenger gives message to the cell by entering the cell
 - (3) Drugs which compete with natural substrate on active site are called competitive inhibitors
 - (4) Morphine can be used as analgesic without causing addiction.

Sri Chaitanya

- 154. A vessel of volume 1 litre contains 1 mole of nitrogen gas at a temperature 12.18K. The pressure of the gaseous mixture, when 50% of the molecules are dissociated into nitrogen atoms at the same temperature is:
 - (1) 4.5 atm
 - (2) 1.5 atm
 - (3) 3.8 atm
 - (4) 2.9 atm
- 155. Which among the following is a condensation polymer?
 - (1) Teflon
 - (2) Buna-S
 - (3) Nylon-6
 - (4) Polythene
- 156. In a sample of FeO, when 12 Fe^{+2} ions are replaced with electrically balanced number of Fe^{+3} ions , then the composition of FeO is:
 - (1) Fe_{0.88}O
 - (2) Fe_{0.96}O
 - (3) $Fe_{0.82}O$
 - (4) $Fe_{0.79}O$
- 157. A disaccharide consisting of two α-D-glucose units in which C₁ of one glucose is linked to C₄ of another α-D-glucose unit is:
 - (1) Maltose
 - (2) Sucrose
 - (3) Lactose
 - (4) Celulose
- 158. The Z-isomer among the following are

$$\begin{array}{cccc} CH_{3}-C-CH_{3} & H-C-CH_{3} \\ \parallel \\ H-C-C_{2}H_{5} & C_{2}H_{5}-C-C_{3}H_{7} \\ I & II \end{array}$$

$$\begin{array}{ccc} Cl-C-Br & Cl-C-Br \\ \parallel \\ H-C-F & F-C-H \\ III & IV \end{array}$$
(1) I, II

- (2) II, III
- (3) III, IV
- (4) I, IV
- 159. Arrange the following compounds in order of dehydrohalogenation (E_1) reaction



- 160. Which of the following reactions do not result in the formation of new C - C bond
 - (1) Fittig reaction
 - (2) Wurtz reaction
 - (3) Wurtz Fittig reaction
 - (4) Williamson's synthesis
- 161. Number of S O bond in $S_2O_8^{-2}$ and number of S – S bond in rhombic sulphur are respectively
 - (1) 8, 8
 (2) 6, 8
 (3) 2, 4
 - (4) 4, 2

Page 21

Hyderabad

of chlorine in

- 171. Which of the following ions is most stable
 - (1) Sn^{+2}
 - (2) Ge^{+2}
 - (3) Si⁺²
 - (4) Pb⁺²



is

- 172. The IUPAC name of
 - (1) Tricyclo propylamine
 - (2) N, N dicyclopropylamine
 - (3) N, N dicyclo propyl cyclopropanamine
 - (4) N, N, N tricyclo propanamine
- 173. Which of the following metal is having least melting point ?
 - (1) Na
 - (2) K
 - (3) Rb
 - (4) Cs
- 174. According to crystal field theory, the M L bond in a complex is
 - (1) partially covalent
 - (2) purely ionic
 - (3) purely covalent
 - (4) purely co-ordinate

175.
$$C_6H_5CN \xrightarrow{Partial} A \xrightarrow{Br_2/NaOH(NaOBr)} B$$
.

Which of the following cannot be used as an acylating agent to B

- (1) CH₃COOH
- (2) CH₃COCl
- (3) $(CH_3CO)_2O$
- (4) $CH_3COOC_2H_5$
- 176. Correct order of radius of elements C, O, F, Cl, Br is
 Sri Chaitanya Page

- $(1) \quad Br < Cl < C < O < F$
- $(2) \quad Br > Cl > C > O > F$
- $(3) \quad Cl < C < O < F < Br$
- $(4) \quad C > F > O > Br > Cl$
- 177. The electronic configuration of bivalent Europium and trivalent Cerium respectively is[Z for Xe = 54, Ce = 58, Eu = 63]
 - (1) $[Xe]4f^7, [Xe]4f^1$
 - (2) $[Xe]4f^{7}6s^{2}, [Xe]4f^{1}$
 - (3) $[Xe]4f^{7}6s^{2}, [Xe]4f^{1}5d^{1}6s^{2}$

 \rightarrow (P)

(4) $[Xe]4f^7, [Xe]4f^15d^16s^2$

OH



. Compound (P) is :-



(1)

- 179. Wrong match is
 - (1) Borax undergoes anionic hydrolysis
 - (2) Orthoboric acid Lewis acid
 - (3) Solid CO₂ Refrigerant
 - (4) Keiselghur Crystalline form of silica
- 180. Which of the following water sample is more polluted ?
 - (1) DO -4ppm , BOD-4ppm
 - (2) DO -2ppm , BOD-150ppm
 - (3) DO -2ppm , BOD-5ppm
 - (4) DO -3ppm , BOD- 2ppm

Hyderabad

23

SRI CHAITANYA EDUCATIONAL INSTITUTIONS, INDIA

A.P, TELANGANA, KARNATAKA, TAMILNADU, MAHARASHTRA, DELHI, RANCHI, CHANDIGARH

SR AIIMS S60

NEET GRAND TEST - 4 KEY

Date : 23-01-2020

BOT : 1 – 5, 11 – 15, 21 – 25, 31 – 35, 41 – 45, 51 – 55, 61 – 65, 71 – 75, 81 – 85 ZOO : 6 -10, 16 – 20, 26 – 30, 36 – 40, 46 – 50, 56 – 60, 66 – 70, 76 – 80, 86 – 90

1) 2	2) 4	3) 3	4) 1	5) 4	6) 2	7) 1	8) 2	9) 2	10) 2
11) 1	12) 3	13) 4	14) 1	15) 4	16) 4	17) 4	18) 3	19) 1	20) 1
21) 1	22) 3	23) 3	24) 1	25) 4	26) 4	27) 3	28) 1	29) 4	30) 3
31) 1	32) 2	33) 1	34) 4	35) 2	36) 1	37) 1	38) 3	39) 2	40) 4
41) 3	42) 4	43) 2	44) 3	45) 2	46) 2	47) 1	48) 2	49) 1	50) 3
51) 3	52) 4	53) 1	54) 3	55) 4	56) 1	57) 3	58) 1	59) 3	60) 1
61) 1	62) 4	63) 4	64) 4	65) 3	66) 3	67) 2	68) 1	69) 2	70) 3
71) 4	72) 3	73) 3	74) 1	75) 1	76) 3	77) 3	78) 4	79) 2	80) 4
81) 2	82) 4	83) 3	84) 1	85) 1	86) 2	87) 3	88) 2	89) 3	90) 1

BIOLOGY

PHYSICS

91) 2	92) 4	93)	1	94)	3	95) 4	96)	3	97)	1	98)	2	99)	1	100)	2
101) 4	102) 2	103)	3	104)	1	105) 4	106)	1	107)	1	108)	2	109)	2	110)	3
111) 2	112) 2	113)	3	114)	2	115) 1	116)	4	117)	1	118)	4	119)	4	120)	1
121) 4	122) 3	123)	1	124)	3	125) 2	126)	4	127)	1	128)	3	129)	4	130)	4
131) 2	132) 2	133)	4	134)	3	135) 2										

CHEMISTRY

136)	2	137)	3	138)	3	139)	3	140)	4	141)	3	142)	2	143)	2	144)	3	145)	3
146)	4	147)	4	148)	4	149)	1	150)	1	151)	4	152)	2	153)	3	154)	2	155)	3
156)	2	157)	1	158)	2	159)	1	160)	4	161)	1	162)	3	163)	1	164)	3	165)	3
166)	2	167)	1	168)	3	169)	1	170)	4	171)	4	172)	3	173)	4	174)	2	175)	1
176)	2	177)	1	178)	4	179)	4	180)	2										

PHYSICS SOLUTIONS

- 91. Transition from (4E to E) Energy of photon $4E - E = \frac{hc}{\lambda_1}$ thus $\lambda_1 = \frac{hc}{3E}$ (1) Transition from $(\frac{7}{3}E - E);$ $\frac{7}{3}E - E = \frac{hc}{\lambda_2}$ thus $\lambda_2 = \frac{3hc}{4E}$ (2) Equation (1) & (2) $\frac{\lambda_1}{\lambda_2} = \frac{4}{9}$ 92. $E = \frac{12400}{\lambda} = 6.2eV$ KE of electron $= eV = e(E \times d) = e(4 \times 1) = 4eV$ Work function = E- W = 2.2 eV
- 93. $\lambda_{c} = \lambda_{p} = \lambda$ $\frac{E_{e}}{E_{ph}} = \frac{\frac{1}{2}m_{e}v_{e}^{2}}{\frac{hc}{\lambda_{p}}} \qquad \left(\therefore \lambda_{e} = \frac{h}{m_{e}v_{e}} \right)$ $\frac{\frac{1}{2}\left(\frac{h}{\lambda_{e}v_{e}}\right)v_{e}^{2}}{\frac{hc}{\lambda_{p}}} = \frac{v_{e}}{2c} \qquad \left\{ \therefore \lambda_{e} = \lambda_{p} = \lambda \right\} = \frac{1.5 \times 10^{8}}{2 \times 3 \times 10^{8}} = \frac{1}{4}$

94.
$$m_1v_1 = m_2v_2 \implies r_1^3v_1 = r_2^3v_2$$

95. Conceptual

- $x \rightarrow \overline{x} \rightarrow \overline{x} \rightarrow \overline{x} \rightarrow \overline{y} \rightarrow \overline{x} \rightarrow \overline{x$
- 97. Conceptual

96.

98. For second surface,
$$\frac{\mu_2}{\nu} - \frac{\mu_3}{\infty} = \frac{\mu_2 - \mu_3}{+R} \implies \nu = \frac{\mu_2 R}{\mu_2 - \mu_3}$$
 for v positive $\mu_2 > \mu_3$ and

for first s
$$\mu_1 = \mu_3$$

99. Given
$$A = 30^{\circ}$$
, $i_1 = 45^{\circ}$ and $r_2 = 0$
Since, $r_1 + r_2 = A$ \therefore $r_1 = A = 30^{\circ}$

Now refractive index of the prism,
$$\mu = \frac{\sin i_1}{\sin r_1} = \frac{\sin 45^0}{\sin 30^0} = \frac{\frac{1}{\sqrt{2}}}{\frac{1}{2}} = \sqrt{2}$$

- 100. $\frac{f_0}{f_e} = 100$; $f_0 = 100 f_e$ $f_0 + f_e = 101 \implies 100 f_e + f_e = 101$; $f_e = 1cm$, $f_0 = 100 cm$ 101. Conceptual
- 102. For minima $y = (n\lambda)\frac{D}{a}$ $(y_3 - y_1) = (3-1)\lambda\left(\frac{D}{a}\right) = 3mm$ a = 0.2mm
- 103. $\Delta R_{eq} = \Delta R_1 + \Delta R_2$

$$R_{eq} \alpha_{eq} \Delta T = R_1 \alpha_1 \Delta T + R_2 \alpha_2 \Delta T \implies \alpha_{eq} = \frac{R_1 \alpha_1 + R_2 \alpha_2}{R_1 + R_2}$$

- 104. $L_{AB} = 4m$ $R_{AB} = 6\Omega$ E=4V $x = \left(\frac{E}{R+R_s}\right) \frac{R}{L} \Rightarrow \frac{5 \times 10^{-3}}{10^{-2}} = \left(\frac{4}{R+6}\right) \frac{6}{4} \Rightarrow R = 6\Omega$
- 105. Conceptual

106.
$$\vec{V}_{cm} = \frac{m_1 \vec{V}_1 + m_2 \vec{V}_2}{m_1 + m_2} = \frac{\vec{V}_1 + \vec{V}_2}{2} = \frac{a\hat{i} + b\hat{j}}{2}$$

 $\vec{a}_{cm} = \frac{m_1 \vec{a}_1 + m_2 \vec{a}_2}{m_1 + m_2} = \frac{\vec{a}_1 + \vec{a}_2}{2} = \frac{3}{2} \left(a\hat{i} + b\hat{j}\right)$

As V_{cm} is parallel to a_{cm} so path is a straight line.

107.
$$\sqrt{2gh} \ge \sqrt{5gh} \implies h \ge \frac{5R}{2}$$

 $h_{\min} = \frac{5R}{2} \implies y_{\min} = h_{\min} - 2R = \frac{R}{2}$
108. $[v] = \begin{bmatrix} T^{-1} \end{bmatrix} \qquad [l] = \begin{bmatrix} L^1 \end{bmatrix} \qquad [F] = \begin{bmatrix} M^1 L^1 T^{-2} \end{bmatrix}$
 $m = \frac{P^2 F}{4v^2 l^2} \implies [m] = \frac{\begin{bmatrix} F \\ v^2 \end{bmatrix} \begin{bmatrix} l^2 \end{bmatrix}}{\begin{bmatrix} v^2 \end{bmatrix} \begin{bmatrix} l^2 \end{bmatrix}} = \frac{\begin{bmatrix} M^1 L^1 T^{-2} \end{bmatrix}}{\begin{bmatrix} T^{-2} \end{bmatrix} \begin{bmatrix} L^2 \end{bmatrix}} \implies [m] = \begin{bmatrix} M^1 L^{-1} \end{bmatrix}$
109. $u = 6.25 \text{ m/s}$

$$a = \frac{dV}{dt} = -\frac{5}{2}\sqrt{v} \implies -\frac{dV}{\sqrt{V}} = \frac{5}{2}dt \implies \int_{u}^{0}\frac{dV}{\sqrt{V}} = \frac{5}{2}\int_{0}^{2}dt \implies \left[-\frac{\sqrt{V}}{1/2}\right]_{u}^{0} = \frac{5}{2}t \implies \sqrt{6.25} - 0 = \frac{5}{4} \times t \implies t = 2s$$

- 110. Mg T = Ma for motion of M $T \times R = I\alpha$ for motion of pulley $T \times 0.2 = (0.32)\alpha \implies T = 1.6\alpha = 1.6\left(\frac{a}{0.2}\right) = 8a$ From Mg – T = Ma $\implies 20 - 8a = 2a \implies a = 2m/s^2$
- 111. Range of projectile is same for the angle of projection θ and $90^{\circ} \theta$. $\therefore \theta_1 = 30^{\circ}$ and $\theta_1 = 90^{\circ} - 30^{\circ} = 30^{\circ}$ Thus $R_1 = R_2$ Also, $H = \frac{u^2 \sin^2 \theta}{2g}$ so that $H \propto \sin^2 \theta$

$$\therefore \frac{H_1}{H_2} = \frac{\sin^2 30^o}{\sin^2 60^o} = \frac{\left(\frac{1}{2}\right)^2}{\left(\frac{\sqrt{3}}{2}\right)^2} = \frac{1}{3} \implies H_1 = \frac{H_2}{3}$$

112. Horizontal acceleration of the system is, $a = \frac{F}{2m + m + 2m} = \frac{F}{5m}$ Lt N be the normal reaction between B and C. Free body diagram of C gives $N = 2ma = \frac{2}{5}F$



Now, B will not slide downward if $\mu N \ge m_B g$ or $\mu \left(\frac{2}{5}F\right) \ge mg$ or $F \ge \frac{5}{2\mu}mg$ so



113.

(Force diagram in the frame of the car)

Applying Newton's law perpendicular to string $mg\sin\theta = mg\cos\theta \implies \tan\theta = \frac{a}{g}$ Applying Newton's law along string $\Rightarrow T - m\sqrt{g^2 + a^2} = ma / T = m\sqrt{g^2 + a^2} + ma$

114. $I_1 w_1 = I_2 w_2$ (or) $I_1 n_1 = I_2 n_2$

115. Energy conservation
$$-\frac{GMm}{R} + 0 = -\frac{3}{2}\frac{GMm}{R} + \frac{1}{2}mV^2$$

 $V_e = \sqrt{\frac{2Gm}{R}}$ so $V = \frac{V_e}{\sqrt{2}}$
116. $g' = \frac{g}{\left(1 + \frac{h}{R}\right)^2}$, $g' = \frac{g}{9}$
 $\frac{g}{9} = \frac{g}{\left(1 + \frac{h}{R}\right)^2} \Rightarrow 1 + \frac{h}{R} = 3 \Rightarrow h = 2R$

117. Heat loss = Heat gain

$$m \times 540 + m \times 1 \times (100 - 90) = 22 \times 1(90 - 20) \implies m = 2.8 g$$

Net mass of water in mixture = 22+2.8 = 24.8 g

118. For mixture of gases

$$\gamma = \frac{n_1 C_{p_1} + n_2 C_{p_2}}{n_1 C_{v_1} + n_2 C_{v_2}}$$

$$C_v = \frac{fR}{2} \text{ where, } C_p = \left(1 + \frac{f}{2}\right)R$$

For Helium : $n_1 = 4, f = 3$

For oxygen :
$$n_2 = \frac{1}{2}, f = 5$$

$$\therefore \frac{C_p}{C_v} = \frac{4 \times \frac{5R}{2} + \frac{1}{2} \times \frac{7R}{2}}{4 \times \frac{3R}{2} + \frac{1}{2} \times \frac{5R}{2}} = \frac{47}{29} = 1.62$$

119. $\lambda_1 T_1 = \lambda_2 T_2$

120.
$$\Delta U = nC_v dT \qquad \Delta Q = \Delta W + \Delta U$$
$$\Delta W = \frac{1}{2} \times (2P_0 + P_0) \times V_0 = \frac{3}{2} P_0 V_0$$
$$\frac{PV}{T} = nR \implies T_1 = \frac{P_0 V_0}{nR}, \quad T_2 = \frac{4P_0 V_0}{nR}$$
$$\frac{P_0 V_0}{T_0} = \frac{2P_0 2V_0}{T'} \implies T' = 4T_0$$

Change in temperature = $3T_0$

When the ball is just released, the net force on ball is W_{eff} (= mg – buoyant force) The terminal velocity 'v_f' of the ball is attained when net force on the ball is zero. \therefore Viscous force $6\pi\eta r v_f = W_{eff}$ When the ball acquires $\frac{2}{3}rd$ of its maximum Velocity v_f the viscous force is $=\frac{2}{3}W_{eff}$ Hence net force is $W_{eff} - \frac{2}{3}W_{eff} = \frac{1}{3}W_{eff}$ \therefore Required acceleration is $=\frac{a}{3}$

124.
$$F = \frac{du}{dx} = -8\cos 2x = -16x$$

$$a = \frac{F}{m} = -\omega^{2}x \Rightarrow \omega = 4$$
125. Conceptual
$$(\frac{V}{2})^{\dagger}, \quad \sqrt{T}$$
126.
$$\cos \theta = \frac{1}{2} \qquad n^{1} = \frac{V}{V - V_{3}\cos\theta} \times n = \frac{V}{\left(V - \frac{V}{4}\right)} \times n = \frac{4}{3} \times n$$
127. Conceptual
128. Initially $V = \sqrt{\left(V_{C} - V_{L}\right)^{2} + V_{R}^{2}} = 10V$ and $X_{L} = X_{C} = R$
Finally $V = \sqrt{V_{R}^{2} + V_{C}^{2}} = \sqrt{2}.V_{C} \Rightarrow V_{C} = \frac{10}{\sqrt{2}}V$
129. emf in loop $e = -\frac{d}{dt}(B \times \pi a^{2}) - = \pi a^{2}\frac{dB}{dt} = 2\pi a^{2}$
Current $i = \frac{e}{R} = \frac{2\pi a^{2}}{R}$
Power $P = e \times i = \frac{4\pi^{2}a^{4}}{R}$
Charge $q = \int_{0}^{2} i dt = \int_{0}^{2} \frac{2\pi a^{2}}{R} dt = \frac{4\pi a^{2}}{R}$
130. $\sigma \ll \frac{1}{R^{2}}$
131. $\Delta U = U_{f} - U_{i} = k_{0} \left(\frac{Qq}{a + x} + \frac{Qq}{a - x} + \frac{q^{2}}{2a} - \frac{2Qq}{2a} - \frac{q^{2}}{2a}\right)$
 $= k_{0}Qq \left(\frac{a(a - x) + (a + x)a - 2(a^{2} - x^{2})}{(a^{2} - x^{2})a}\right) = k_{0}Qq \left(\frac{2x^{2}}{a(a^{2} - x^{2})}\right)$
Since 'x' is small, $a^{2} - x^{2} = a^{2}$
 $\Delta U = k_{0}Qq \left(\frac{2x^{2}}{a^{3}}\right)$
132. $\frac{E}{B} = C$
133. $F = \frac{q^{2}}{2\epsilon_{0}A}$, when capacitor is isolated
134. $B = \frac{\mu_{0}i}{2\pi r} \Rightarrow B \ll \frac{1}{r}$
135. Acceleration is perpendicular to B
 $a \overline{B} = 2x + 3 - 4 = 0 \Rightarrow x = \frac{1}{2}$