

## **ENTRANCE EXAMINATION-2018**

B Sc- Hons Physics/Mathematics/Applied Mathematics/Chemistry/B Sc

ROLL NO.

B 0616747

Time: 1 Hour 45 Minutes

Total Marks: 100

## **Instructions to Candidates**

- Do not write your name or put any other mark of identification anywhere in the OMR Response Sheet. IF ANY MARK OF IDENTIFICATIONS IS DISCOVERED ANYWHERE IN OMR RESPONSE SHEET, the OMR sheet will be cancelled, and will not be evaluated.
- 2. This Question Booklet contains the cover page and a total of 100 Multiple Choice Questions of 1mark each.
- 3. Space for rough work has been provided at the beginning and end. Available space on each page may also be used for rough work.
- There is negative marking in Multiple Choice Questions. For each wrong answer, 0.25 marks will be deducted.
- 5. USE OF CALCULATOR IS NOT PERMITTED.
- 6. USE/POSSESSION OF ELECTRONIC GADGETS LIKE MOBILE PHONE, iPhone, iPad, pager ETC. is strictly PROHIBITED.
- 7. Candidate should check the serial order of questions at the beginning of the test. If any question is found missing in the serial order, it should be immediately brought to the notice of the Invigilator. No pages should be torn out from this question booklet.
- 8. Answers must be marked in the OMR response sheet which is provided separately. OMR Response sheet must be handed over to the invigilator before you leave the seat.
- 9. The OMR response sheet should not be folded or wrinkled. The folded or wrinkled OMR/response Sheet will not be evaluated.
- Write your Roll Number in the appropriate space (above) and on the OMR Response Sheet. Any other details, if asked for, should be written only in the space provided.
- 11. There are four options to each question marked A, B, C and D. Select one of the most appropriate option and fill up the corresponding oval/circle in the OMR Response Sheet provided to you. The correct procedure for filling up the OMR Response Sheet is mentioned below.
- 12. Use Black or Blue Ball Pen only for filling the ovals/circles in OMR Response Sheet. Darken the selected oval/circle completely. If the correct answer is 'B', the corresponding oval/circle should be completely filled and darkened as shown below.

CORRECT METHOD

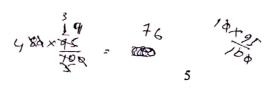
A C D

WRONG METHOD

A  $\otimes$  C D A  $\otimes$  C D

1.	An aqueous solution of (A) Neutral	Na <sub>2</sub> SO <sub>4</sub> is (B) Acidic		(C) Basic		olloida
	Potash alum is — (A) Simple Salt			(C) Double Salt	(D) A	cidic Salt
3.	Which of the following (A) SO <sub>2</sub>	is a solid acidic (B) CaO	oxid	e? (C) Na <sub>2</sub> O <sub>2</sub>	(D) P	<sub>2</sub> O <sub>5</sub>
	Which of the following (A) NaCl Solution is (C) CH <sub>3</sub> COO Na so	lution is alkalin	е	(D) Na HCO3 Soluti	s acidi ion is	ic acidic
5.	Which of the following (A) N <sub>2</sub> H <sub>4</sub>	is the strongest (B) N <sub>3</sub> H	base	e? (C) NH <sub>3</sub>	(D) F	PH <sub>3</sub>
6.	Which of the following (A) Adenine	bases is not pre (B) Thymine	esent	t in RNA? (C) Uracil	(D) (	Cytosine
	The most electronegat	(B) Bromm		(0)00010111	31 0	Kenon
8.	How much N/5 HCl so (A) 100 ml	olution would be (B) 200 ml	e req	uired to neutralize 2 (C) 50 ml	2 g of (D)	CaCO3 ? 90 ml
	One mole of H <sub>2</sub> SO <sub>4</sub> wi (A) One mole of NH (C) Two moles of C	H <sub>3</sub> Ca (OH) <sub>2</sub>		(D) Two moles of S	S <sub>r</sub> (OH)	2
10	). For preparation of 25 (A) 1.15 g	50 ml. N/10 NaI (B) 4.10 g	HCO:	3 Solution, the amor (C) 2.1 g	unt of (D)	NaHCO3 taken is:— None of these
11	. Compound having fo (A) Alkane	ormula C <sub>12</sub> H <sub>24</sub> is (B) Alkene	s:	(C) Alkyne	(D)	None of these
12	2. The compound CH <sub>3</sub> (A) Butanoic Acid	CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CI (B) Propanoid	H <sub>2</sub> C( c Aci	OOH is : d (O) Hexanoic Acid	i (D	) Heptanoic Acid
13	<ol> <li>An example of a che</li> <li>(A) Density</li> <li>(C) Solubility</li> </ol>	mical property i	(R) \( \mathcal{V} \)	Mass Acidity		
14	I. The gas evolved whe (A) $N_2$ (C) $H_2$	n methylamine	(B) I	ts with nitrous acid NH <sub>3</sub> C <sub>2</sub> H <sub>6</sub>	l is	
1	5. The compound havi (A) Geometrical Is (C) Optical Isome	somers	(B) (	NOH is – Cis-trans isomers Isomers		
1	6. Which of the followi (A) CH <sub>3</sub> COCl	ng is ethanoyl c (B) CH <sub>3</sub> CH <sub>2</sub> C			C1 (	(D) None

			- 1
(A) Z-Mothyl butters (C) Ethyl propane (D	) 2, 4– dimethyl butane		
	- )´Acetaldehyde Cyanohyo ) Acetone	drin	
19. Glucose on Oxidation gives: –  (A) Acid (B) Aldehyde	(C) Ester	(D) Ether	
20. Which of the following compound Con (A) Acetic Acid (B) Acetaldehyd	tains carbonyl group? e (C) Formaldehyde	(D) All of them	
21. Which of the following is not an air po (A) CO (B) SO <sub>2</sub>	llutant? (C) NO	(D) N <sub>2</sub>	
(11) 012400	photochemical smog? Hydrocarbons Carbon monoxide		
23. $K_2CrO_4$ is used to identify– (A) $Cu^{2+}$ (B) $Ba^{2+}$	(C) Ag+	(D) Ca <sup>2+</sup>	
24. Which of the following nitrates on stro (A) AgNO <sub>3</sub> (B) Pb(NO <sub>3</sub> ) <sub>2</sub>	ong heating leaves the m (C) Cu(NO <sub>3</sub> ) <sub>2</sub>	etal as the residue? (D) Al (NO <sub>3</sub> ) <sub>2</sub>	
25. Which among the following is most so (A) Mg (OH) <sub>2</sub> (B) Sr (OH) <sub>2</sub>	luble in water? (C) Ca (OH) <sub>2</sub>	(D) Ba (OH) <sub>2</sub>	
26. A Young's double slit experiment		source of light. The shape	of
interference fringes formed on the so (A) Parabola (B) Straight lin	ne (C) Circle	(D) Hyperbola	
27. Two slits are made one millimeter ap	part and the screen is p	laced one metre away. The frin	ıge
separation when blue green light of v (A) 5×10 <sup>-4</sup> m (B) 2.5×10 <sup>-3</sup> m		sed is (D) 10×10⁴m	
28. In Young's double slit experiment t interference experiment is 25:9.Th	he ratio of intensity of e ratio of widths of two	the maxima and minima in slits is	the
(A) 18: 3 (B) 4: 1	(C) 8: 1	(D) 16:1	
• 29. A screen is placed 50 cm from a s	single slit which is illus	minated with light of waveler	igth
mm, the width of the slit is	e first and third minim	a in the diffraction pattern is	3.0
(A) 1×10 <sup>-4</sup> m (B) 2×10 <sup>-4</sup> m	Jer 0.5×10-4 m	(D) 4×10-4 m	
30. The input resistance of a transistor collector current increases by 2 m/s voltage gain of the amplifier is (A) 100 (B) 500	is $1000~\Omega$ on charging A. If a load resistance $\alpha$	g its base currently by 10 $\mu$ A, of 5 $k\Omega$ is used in the circuit,	the the
5 65 5 125 3 8 1 5 5 0 6 5 6 0 6 6	(C) 1000	(D) 1500 🔬 ぐっ	1x10-3
1 25 3 4 25 25 3 5 7 3 3 25 3 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	(C) 1000 $ \int_{1} = 42524 $ $ \int_{2} = 924 $	- : XX/L = -	500×10-3
17 125 50x		2000 x 1070 5000 x 1070 5000	10
	/ •	7000	
		Scanned by CamScanne	er



<b>31.</b> In an <i>n-p-n</i> circuit collector, then	it transistor, the collec	ctor current is 10 mA. If 80%	% electron emitted reach the
(A) the emitter cu (C) the base curre		(B) the emitter current v (D) the base current will	be 1.5 mA
of diameter 10 ci	ii. At what distance in	om the surface will the bub	(D) E and
(A) 2.5 cm $\frac{V}{LL} = \frac{h_L^2}{h_D}$ its focal length. The	n stands in front of a	convex mirror. His distance	e from the mirror is equal to
$\frac{1}{LL} = \frac{h_0}{h_0}$ its focal length. To (A) 0.25 m	he height of this imag (B) 0.33 m	e is (C) 0.5 m	(D) 0.67 m
focal length 2.0 cr (A) 100	n and a tube length 2 (B) 200	0 cm, the magnification will (C) 250	(D) 300
35. A convergent beam focus 0.3 m behin the absence of the	u me iens. The posit	igh a diverging lens of foca tion of the point at which t	l length 0.2m and comes to he beam would coverage in
(A) 0.12 m	(B) 0.6 m	(C) 0.3 m	(D) 0.15 m
refractive index μ.	On the back face of s	slab is a reflecting plane n	glass slab of width d and of hirror. An observer sees the hice as seen by the observer
WINDO	AND DESCRIPTION OF THE PERSON	Observer	
	h	ro	
	mmm	d d	
(A) $h + \frac{2d}{\mu}$	(B) 2h +2d	(C) h + d	(D) $h + \frac{d}{\mu}$
<b>37.</b> A plane mirror is pla object is moving with respect to its object is	h 3î+4ĵin front of t	he plane mirror. The rela	The mirror is fixed. A point ative velocity of image with
$(A) - 8\hat{j}$	(B) 8 ĵ	(C) $3\hat{j} - 4\hat{j}$	(D) -6j
between the ends of location has a magnit	the wings having a ude of 5× 10-4 T and		oltage difference developed arth's magnetic field at the (D) 3.8 V
<b>39.</b> The co-efficient of mutu (A) medium between the (C) orientation of the two	coil	o coils depends on (B) distance betw (D) all of these	een the coils
m dise	•		

6 40. The direction of induced current in the coils A and B in the situation shown in the figure is G(A) p to q in coil A and x to y in coil B (C) p to q in coil A and y to x in coil B 41. Two solenoids of equal number of turns have their lengths and the radii in the same ratio

 $\Rightarrow$  (B) q to p in coil A and x to y in coil B (D) q to p in coil A and y to x in coil B

1:2. The ratio of their self inductances will be (D) 1:4(C) 1:1 (B) 2:1(A) 1:242. A square of side x meters lies in the x-y plane in a region, where the magnetic field is given by  $\vec{B} = B_0(3\hat{\imath} + 4\hat{\jmath} + 5\hat{k})T$  where  $B_0$  is constant. The magnitude of flux passing through the square

(B)  $3B_0x^2$  Wb (C)  $2B_0x^2$  Wb (A) 5 B0x2 Wb 43. If the number of turns per unit length of a coil of solenoid is double, the self inductance of the

solenoid will

(A) remain unchanged (B) be halved

(C) be doubled

(D) become four times

44. In a pure capacitive circuit, if the frequency of a ac source is doubled, then its capacitive reactant will be

(A) remain same

(B) doubled

(C) haived

(D) zero

45. At resonance frequency the impedance in series LCR circuit is (A) maximum

, (B) minimum

(C) zero

(D) infinity

46. Streamline flow is more likely for liquids with

(A) high density and high viscosity

(B) Tow density and low viscosity

thigh density and low viscosity (D) low density and high viscosity

47. In a potentiometer a cell of emf 1.5V gives a balanced point at 32 cm length of the wire. If the cell is replaced by another cell the balance point shift to 65.0cm, then the emf of second cell is ~ 66 (A) 3.05V JBY 2.05V

(C) 4.05V

(D) 6.05V

48. When a drop of water splits up into number of drops

(A) area increases

(B) volume increases

(C) energy is absorbed

(D) both (A) and (C)

49. A liquid will not wet the surface of a solid if its angle of contact is (A) zero (B) 90°

(D) greater than  $90^{\overline{b} H}$ 

50. Which of the following instrument is used for measuring gauge pressure?

(B) Barometer

(C) Manometer

(D) Hydrometer

51. For any real number x and y,  $\cos x = \cos y$  implies x equal to

(B)  $2n\pi \pm y$ 

(C)  $n\pi + (-1)^n$ 

(D)  $n\pi + y$ 

		_	press (5-3) (A) -10-1		he form a+. (B) -1	ib 0-199i	(C) -10	-200i	(1	D) -10	
	į	53. In	how many	ways	can 10 exa	mination p	papers show	ıld be mar	naged so th	hat the bes	st and worst
		exa	mination p (A) 7 *9!	apers	never app (B) 8		r (C) 8 *9	)!	(1	O) 9 *8़¹∳	
	5	<b>34.</b> §	Solve the fo	ollowi	ng System	of inequalit	ies graphic	ally	t y 4 1		
				74	+ <u>y</u> = 1		$\begin{array}{l} + 2y \le 8 \\ z + y \le 8 \\ \ge 0 \ y \ge 0 \end{array}$	8	4	000	
				_	on lies in	_					8
		(A)	second q	uadr	ent (B) fir	st quadrei	nt (C) thi	rd quadr	ent (D)	fourth qu	iadrent
ماره می	5	5. Find	d the Coeff	icient	of $x^6y^3$ in t	he expansi	on of $(x + 2)$	<i>y</i> ) <sup>9</sup>	(T)	600	
85		( <i>A</i>	A) 662		(B) 672		(C) 68	2	(D)	692	
8)	56	. The	e remainde	r whe	n 7 <sup>103</sup> is di	vided by 25	5 is				
テントリ		(A	A) 16		(B) 18		(C) 9		(D)	0	
- Service	57			) <sup>cot x</sup> be		is at $x=0$ ,	then $f(0)$	s equal to		6.11	
100		, ,	0		(B) 1/e	!-	(C) e		(D) r	one of th	ese
	58.	. In th	e expansio	n of	$\left(x-\frac{1}{3x^2}\right)^9,\ 1$	he term in	dependent	of $x$ is			
		(A)	$T_3$		(B) T <sub>4</sub>		(C) $T_5$		(D) <sub>,</sub> :	none of th	nese
	59.		consecuti (0,1)	ive ve	rtices of a (B) (2,1)	parallelogr	am are (-2 (C) (1,2			Find the for	ourth vertex nese
	60.	_	abola <i>y</i> ² = . 4/3	<i>px</i> pa	sses throu (B) 7/2	gh the poir	nt (2,-3),the (C) 9/2		gth of lat (D) 2		is
ج	61. >	A coin	is tossed $2^n$	n tim	es then the $(B) n^2$	e number (	of elements (C) n	in its sa		ce are one of the	ese
5, 2	<b>62.</b> ′		nction $f(x)$ $(1, \infty)$		ot <sup>-1</sup> $x + x$ in (B) $(-1, \infty)$		the interval $(C)$ $(-\infty)$		(D) (0	,∞)	
32	63.	An un	n contains	5 bl	ue and an	unknown	no. x of red	l balls. Tv	vo balls a	re drawn a	at random. If
रेड्रेक्		(A)			h of them (B) 3	oeing blue	is 5/14, th (C) 2	ien x is	(I	)) 5	1.8
		(A) 4	4.75	(	B) 5.50		ta: 6, 8, 10 (C) 5.13		(D	5.74	
2(X = ,	2)		P (	(E) (%)	= 1/2. = 5/14	5 5 1/2	× 5 5 5 14	= 5/8	7 = 2	4 x 16	
2	<i></i>	X	= 5 x	2	01	14.	+ 32 14	10+821	7	3 / Jot89	Λ
	7	SAX	= 14	5π.	x = 9	-1, -1		, 0	487	= 18 g	
											y CamScanner

$$ax + y + z = \alpha - 1$$

$$x + \alpha y + z = \alpha - 1$$

$$x + y + \alpha z = \alpha - 1$$

has no solution, if  $\alpha$  is

(B) not -2

(D) None of them

66. Differentiation of  $a^x$  with respect to x, where a is a positive constant, is  $(B) a^{x} \log x$ 

$$(B) a^x \log x$$

67. If the Rolle's theorem holds true for the function  $y = x^2 + 2$ , a = -2 and b = 2 then there exist  $c \in (-2,2)$  such that f'(c)=0, then the value of c is

$$c \in (-2, L)$$

(B) 1

68. The line y=x+1 is a tangent to the curve  $y^2=4x$  at the point

69. Find the area lying above x-axis and included between the circle  $x^2 + y^2 = 8x$  and inside of the

parabola  $y^2 = 4x$ 

(A)  $\frac{7}{2}(8+3\pi)$ 

(D)  $\frac{4}{2}(8+3\pi)$ 

(B)  $\frac{2}{10}(8+3\pi)$  (C)  $\frac{5}{3}(8+3\pi)$ 70. Find the equation of the curve passing through the point (1,1) whose differential equation is

the equation of the curve passing through 
$$xdy = (2x^2 + 1)dx (x \neq 0)$$

(A) 
$$y = x^3 + \log|x|$$
 (B)  $y = x^2 + \log|x|$ 

(C) 
$$y = x + \log |x^2|$$

(D) 
$$y = x^2 + \log|x^3|$$

(A)  $y = x^3 + \log|x|$  (B)  $y = x^2 + \log|x|$  (C)  $y = x + \log|x^2|$  (D)  $y = x^2 + \log|x^3|$ 71. Find the angle between two vectors  $\vec{a}$  and  $\vec{b}$  with magnitudes 1 and 2 respectively and when

$$\vec{a} \cdot \vec{b} = 1$$

$$(A) \frac{\pi}{3}$$

 $\vec{a} \cdot \vec{b} = 1$ (B)  $\frac{2\pi}{3}$ (C)  $\frac{\pi}{6}$ 72. Solve the following linear programming problem graphically:

Minimize Z = 3x + 9y subject to the constraints

$$\frac{2\ell}{10} + \frac{y}{10} \ge 60$$

$$x + 3y \le 60$$

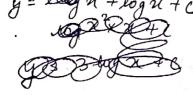
$$x + y \ge 10$$

$$x \leq y$$

$$x \ge 0, y \ge 0$$

- (A) Minimum value is 60 at the point (5, 5) of the feasible region
- (B) Minimum value is 50 at the point (5, 5) of the feasible region
- (C) Minimum value is 60 at the point (4, 5) of the feasible region
- (D) Minimum value is 50 at the point (4, 5) of the feasible region

2.6 s/21/18/ @40  $\int dy = \int \left(\frac{2n+1}{n}\right) \frac{dn}{2} = \cos \theta.$ y = lag 2 + log 2 + C |= 1 + log 1



 $\chi^2 - 4\chi = 0$ 21(2-4) 2=4.74=4

9 73. Find the distance between the points P(6,5,9) and the plane determined by the points A (3, -1, 2), B (5, 2, 4), C (-1,-1,6) (A)  $\frac{3\sqrt{34}}{17} \sqrt{lRSD}$  (B)  $\frac{4\sqrt{34}}{17}$ 74. Evaluate (Six 2) +  $\sqrt{cR_{NQ}}$ (D)  $\frac{4\sqrt{39}}{15}$ (C)  $\frac{2\sqrt{39}}{15}$  $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \frac{dx}{1 + \sqrt{\tan x}}$ (A)  $\frac{\pi}{3}$  (B)  $\frac{\pi}{4}$  $\Rightarrow$  75.  $\tan^{-1}\sqrt{3} - \sec^{-1}(-2)$  is equal to
(A)  $\pi$  (B)  $-\frac{\pi}{3}$ 77. Solve  $\frac{5-2x}{3} \le \frac{x}{6} - 5$ , then the answer is: (A)  $x \in [8, \infty]$  (B)  $x \in [0, 8]$  $(\mathcal{C}) x \in (8, \infty) \qquad (D) x \in (-\infty, 8]$ 78. Sum of the sequence 7, 77, 777, 7777, ... to n term is  $(A) \frac{7}{9} \left[ \frac{10(10^n - 1)}{9} - n \right] \qquad (B) \frac{7}{9} \left[ \frac{10(10^n - 1) - n}{9} \right] \qquad (C) \frac{7^n}{9} \left[ \frac{10(10^n - 1)}{9} - n \right] \qquad (D) \frac{7}{9^n} \left[ \frac{10(10^n - 1)}{9} - n \right]$ **79.** If points A(1,0,-6), B(-3,p,q) and C(-5,9,6) are collinear then the values of p and q are 80. If  $R = \{(3,3), (6,6), relation is (A) reflexive and transit. (C) an equivalence relation

81. Which of the following is not a gland?

(A) Stomach (B) Liver

How much blood does an average add Litre (B) 4-5 Litre$ (A) p=5, q=3 (B) p=6, q=1 (C) p=3, q=2 (D) p=6, q=2**80.** If  $R = \{(3,3), (6,6), (9,9), (12,12), (6,12), (3,9), (3,12), (3,6)\}$  be a relation the set  $A = \{3,6,9,12\}$ . the (B) reflexive only (D) reflexive and symmetric only (B) Live.

82. How much blood does an average adult have in the body?

(B) 4-5 Litre (C) 5-6 Litre (D) Pancreas (D) 6-7 Litre 83. Which of the following toxic gases in the environment lowers the resistance to pneumonia in (B) Nitrogen di oxide (A) Sulphur di oxide (D) Hydrogen chloride (C) Carbon di oxide

84. Who was awarded the Nobel Prize for the discovery of neutrons?

- (A) Rutherford
- (B) Chadwick
- (©) Bohr
- (D) Goldstein

(-4, p, q+6)+(-2, 9-p, 6-2) = (-6, 9; 12)

85. Electron was first ide	ntified by: (B) Daniel Rutherford	(C) J Kepler	(D) Ha	ames Chadwick
(A) U. neriod of a I	(B) Daniel (B) Daniel (B) Increases	(C) Remains the	same	(D) Decreases
(A) Becomes zero	(B) Meros s a fixer in photography is:	(B) Sodium thio (D) Ammonium J	sulphat persulp	te hate
(C) Sodium sulphate	:			
ss. Rectifiers are used to (A) Low voltage to hi (C) DC to AC	gh voltage	(B) High voltage (D) AC to DC		
89. BFJ, IMQ, PTX, ??: (A) XBF	(B) XAE	(C) WAE	(D) \	WBF
90. UV3, VU8, XS15, AP (A) DL35	24, ??: (B) EL37	(C) DK37		EL35
e-y	ight, then right again and	then go to the left. I	n which	n direction are you
now? (A) North	(B) South	(C) East	CON	West
92. Dengue fever is caus (A) Bacteria	ed by? (B) Fungi	(C) Virus	D. Prop.	Protozoan
93. 1.Birth 2.De	eath 3.Funeral 4.M	[arriage 5.]	Educati	on
What is the correct o	rder?		(7)	10450
(A) 4, 5, 3, 1, 2	(B) 2, 3, 4, 5, 1	(0) 1, 5, 4, 2, 3	(D)	1, 3, 4, 5, 2
94. As lightning accomp	panies thunder			
(P) was mingled with (Q) so in my character (R) the mutterings (S) a flash of humo	cter of my wrath ~			
What is the correc	t order?			
(A) QSPR	(B) PRSQ	(C) QPRS	LI.	DYQRPS
95. It was true that  (P) the pet dog (Q) would never (R) we once had (G) (S) except on the	d ne sofa			
(A)RPQS				
	(B) SPQR	(C) PRQS		(D) PQSR

Direction (6.30-100)	): Select appropriate op	tion to fill in the blanks	:
<ul><li>96. Everyone in this univ</li><li>(A) about</li></ul>	verse is accountable to God (B) against		(D) of
ball on.	s allege that prices of essen	tial commodities are	like a runaway
(A) soaring	(B) reviving	(C) flying	(D) leaping
98. A son who is unable to	o look his father in the face (B) arrogant	e is (C) timid	(D) ashamed
99. Myst we be subjected (A) tiresome	to your complaints (B) fearsome	all day long? (C) awesome	(D) gleesome
<b>100.</b> I like listening to W my own beliefs.	esley go on about politics	and social issues; his opin	
(A) latent	(B) explicit	(C) consonant	(D) ensconced