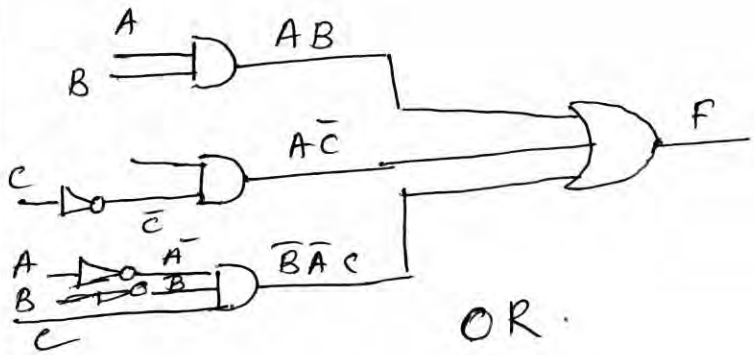
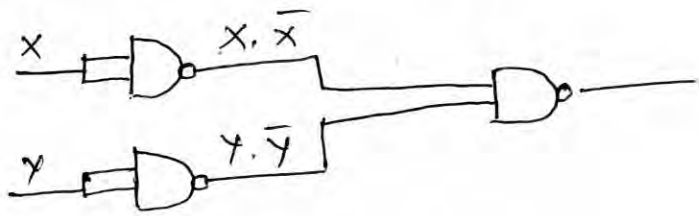
FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

SUBJECT : COMPUTER INFORMATION TECHNOLOGY **CODE. NO: 614**

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1		Binary	1	1
2	a	$(1111011011)_2$	1	
	b.	$(6844)_{10}$	1	
	c.	$(5.625)_{10}$	1	3
3.	a.	 OR	2	2
4.			2	2
5.		Correct truth table.	2	2
6.		Instruction Set.	1	1
7.		Naming registers in CPU like MBR, MAR, PC, Accumulator, IR, etc - 1 mark. Functions of registers – 2 marks	3	3
8.	a.	Converts HLL programs to machine language	1	
	b.	Compiler, interpreter, Assembler – 1 mark	2	3

9.	a	FDD, CDROM, HDD, ROM, SDRAM, DDRRAM	1	1
	b.	Floppy Disk Drive Hard disk drive.	1	
	c.	Mention names – 1 mark Explanation – 1 mark.	2	4
10		Any three among Single program, Multiprogram, Time sharing, Realtime, multitasking, multithreadg etc. Mentioning types – 1 mark. Explanation – 1 ½ mark. Example – ½ mark.	3	3
11.		Free – freedom to copy, distribute and modify – mostly free of cost – not copyrighted – available under GNPL. Proprietary – Restrictions for copying, modification and distribution – available for a price – Copy righted.	2	2
12.		Converting digital signals generated by Computers to analog signal suitable for transmission and back or mention modulation / demodulation	1	1
13.	a.	Social networking, Social media	1	
	b.	Explanation of browsing / Mentioning search engines like google, email, Social networking, file transfer, file sharing etc. any three	2	
	c.	Hacking, Spreading virus, defamation of individuals, pornography, any other illegal use.	2	5
14.	a.	True.	1	
	b.	Telemedicine, educational websites, travel tickets, voluntary organisations websites, Banking etc.	2	3.

OR.

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
15.	a.	Explanation of any three fields like education, science and technology, research, fashion designing, travel ticketing etc.	2.	
	b.	Desktop Publishing	1	3.
16.	a	Yes.	1	
	b.	Any four properties like finiteness, definiteness unambiguous, use of any language etc.	2.	
	c.	Largest of three numbers	1	4
17.		Decision making/condition, connections/Break in flow.	1	1
18.		Any 8 errors out of 9.	2	2
19.	.	(1) P=10, q=11, (2) P=11, q=11	2	2
20.		(a) % = binary (arithmetic) (b) -- unary (decrement) (c) !! binary (logical, OR) (d) != binary (relational)	2	2
21.		Syntactical correctness - 1 mark Logical correctness of the whole program - 1	2	2
22.		Use of switch statement - 1 mark. Syntactical correctness - 1 mark. Logical correctness of the whole prgm - 1 mark.	3	3
23.		OR Use of switch statement - 1 mark Syntactical correctness - 1 mark Logical correctness of the whole prgm - 1 mark	3	3

24.

```
if (a>b)
if (a>c)
  big=a;
else
  big=c;
else
  if (b>c)
    big=b;
  else
    big=c;
```

2 2

25. Nested Loop — 1 1

26.
1. islower() – checks whether character is lower case
   tolower() – Converts character to lower case.
2. isupper() → checks whether a character is upper case
   toupper() – convers a character to upper case. — 2 2

27. function declaration tells the compiler about a function's name, return type, parameters – 1 mark.
A function definition associates the function name/type with the function body – 1 mark. — 2 2

OR

28.
Syntactical correctness – 1 mark.
Logical correctness – 1 mark. — 2 2

29.
Use of arrays – 1 mark.
Syntactical correctness – 1 mark.
Logical correctness of the whole program – 2 mark — 4 4.

Moby Varghese
THSS Aluva

Vijayalakshmi. S
THSS, Muttom

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SUBJECT : CHEMISTRY CODE. NO: 616

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1.	a)	i / ii / iii / iv	1	
	b)	CH_2O	1	
		CH	1	4
		CH_2O	1	
		CHCl	1	
	c)	Law of multiple proportion	1	
2.	a) i)	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^1 3d^5$ or [Ar] $4s^1 3d^5$	1	
	ii)	10 electrons in d subshell	1	5
	iii)	1s or diagram	1	
	b)	Statement / mathematical expression / significance	2	
3.	a)	Definition	2	
	b)	size of atom / effective nuclear charge / electronic configuration	2	4
	c)	oxidation state = +3 or Covalency = 6	2	
4.	a)	Trigonal bipyramidal / diagram	1	
		sp^3d hybridisation	1	
	b)	Axial bonds are longer and weaker than equatorial bonds / PCl_5 is unstable		

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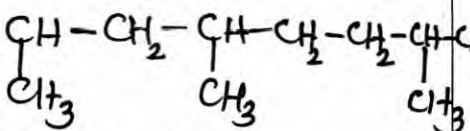
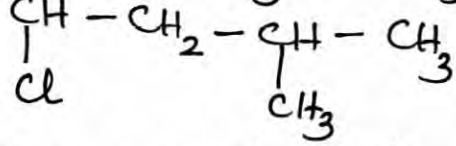
Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		repulsion between axial and equatorial bond / $PCl_5 \rightarrow PCl_3 + Cl_2$ or correct explanation	2	5
	c)	CN^- / O_2^- / NO^+ / CN^+ / definition of bond order / equation of bond order / related explanation	1	
5.	a) i)	viscosity or related explanation	2	4
	ii)	Surface Tension or related explanation	2	
	b) i)	velocity possessed by maximum fraction of molecules	2	
	ii)	N_2	2	
6	a)	intensive / extensive / Heat capacity / Entropy / Refractive index / surface tension	2	4
	b)	$\Delta G = \Delta H - T\Delta S$	2	
		$\Delta H = \Delta U + \Delta n RT$	2	
		$\Delta H = \Delta U + P\Delta V$	2	
		Correct substitution	2	
7.	a)	NaCl - neutral	2	5
		NH_4NO_3 - acidic	2	
		NaCN - basic	2	
		$NaNO_2$ - basic	2	
		or correct equation / explanation	2	
	b)	Blood is a buffer solution	2	
	c)	Equation	1	
		Substitution	1	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
8.		Skeletal equation with oxidation number Correct answer	2 1	3
9.	a) b)	One method of preparation of H_2 gas explanation	3 1	4
10.	a) b)	explanation i) NaOH / sodium hydroxide ii) $NaHCO_3$ / sodium hydrogencarbonate iii) $Ca(OH)_2$ / calcium hydroxide (iv) $Ca(OH)_2$ / calcium hydroxide Two correct name / formula	2 1 1 1 1 2	4
11.	a) b) c)	formation of NaOH / equation / explanation one use 3-D network structure / strong C–C bond / sp^3 hybridisation / hardest substance / no free electron	2 2 2	4
12.	a)	(i) 3-bromo  ii) 	2 2	
	b)	$CH_3\dot{C}H_2$ is more stable / correct explanation	2	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
	c)	difference in solubility/principle/ explanation	2	
	a)	i) 3-bromo-3-chloroheptane	2	
		ii) 4-ethyl-2-methyl aniline	2	6
	b)	$(CH_3)_3\overset{+}{C}$ is more stable/hyperconjugation or +I effect	2	
	c)	Liquid boils at a lower temp. without decomposition or correct explanation	2	
13.	a)	i/ii/iii/iv	1	
	b)	ethyne passed through red hot iron tube/cyclic polymerisation or equation	2	5
	c) i)	Friedel Crafts alkylation/methyl benzene/toluene or structure	2	
	ii)	Addition reaction/$C_6H_6Cl_6$/BHC/ gammaxene or lindane or structure	2	
14.	a)	one adverse effect of global warming/definition of global warming/green house effect	3	3
	b)	SO_2	1	

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1. Dr. George Tittrialem HSST Members

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12. [illegible] Lagesh kevu 13th HSS. Pulluvila.

13. Sajeev NM HSS Chelembra

Sajeev TVM.

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

FINALIZED SCHEME FOR VALUATION

Subject :BIOLOGY- Part A. BOTANY Code No: 617 A Max.Score:30

Qn.No		SCORING INDICATORS	Split Score	Total Score
1		b)F.Skoog	1	1
2		b) i and iv	1	1
3		Help in CO_2 fixation by photosynthesis,increase level of oxygen ,Primary producers on ocean,used as food, hydrocolloids(water holding substances) are obtained, Algin and carrageen are used as commercially, agar is obtained from Gelidium and Gracillaria,agar used to grow microbes, preparation of ice -creams and jellies , Chlorella and Spirulina used as protein enriched food suplements ,food suplements for space travellers etc. (any four correct responses like this)	½x4	2
4		Nitrogensae enzyme/Mo-Fe protein leg-haemoglobin	1 1	2
5		In C_3 plants O_2 binds to RuBisCO. The RuBP instead of being converted to 2 molecules of PGA, binds with O2 to form one molecule of phosphoglycerate and phosphoglycolate in a pathway called photorespiration./Conditions for photorespiration-Dual nature of RuBisCO,increased O_2 concentration, moderate temperature. In the photorespiratory pathway -neither synthesis of sugars nor of ATP.a wastefull process(½ score) Release CO2 with the utilization of ATP. No synthesis of ATP or NADPH (any two related responses of photorespiration give full score 2) OR equation (full score)	1 1	2

6		Ripening of fruits, breaks seed and bud dormancy, initiates germination in peanut seeds, sprouting of potato tubers, promotes rapid internode/petiole elongation in deep water rice plants, helps leaves /upper parts of the shoot to remain above water, promotes root growth and root hair formation, helping the plants to increase their absorption surface, initiate flowering and for synchronising fruit-set in pineapples, induces flowering in mango, promote senescence and abscission of leaves and flowers,fruits and promote female flowers in cucurbits (any two correct responses like this)	1 1	2
7		If a chemical process is affected by more than one factor, then its rate will be determined by the factor which is nearest to its minimal value: it is the factor which directly affects the process if its quantity is changed.(Definition or Explanation) The plant factors include the number, size, age and orientation of leaves, mesophyll cells and chloroplasts, internal CO2 concentration and the amount of chlorophyll . external factors -availability of sunlight,temperature, CO2 concentration and water (Any two)	1 ½ ½	2
8		Endodermis is impervious to water because of a band of suberised matrix called the casparian strip. Water molecules are unable to penetrate the layer, so they are directed to wall regions that are not suberised into the cells through the membrane (symplast). (any one reason give full score)	2	2
9	a b	iv)inflorescence Actinomorphic-Flower can be divided into two equal radial halves in any radial plane passing through the centre/floral symbol with example/Radial symmetry. Zygomorphic-Flower can be divided into two similar halves only in one particular vertical plane/ floral symbol with example/ bilateral symmetry.	1 1 1	3

10	a	Cork cambium/phellogen/inter fascicular cambium	1	3
	b	In dicot stems, the cells of cambium present between primary xylem and primary phloem is the intrafascicular cambium. The cells of medullary cells, adjoining these intrafascicular cambium become meristematic and form the interfascicular cambium. Thus, a continuous ring of vascular cambium is formed .Cambium partially primary and partially secondary Or the intrafascicular cambium joins with interfascicular cambium and form vascular cambial ring-give 1score(Any one response of formation of vascular cambium)	1	
		In dicot root ,the vascular cambium is completely secondary in origin. It originates from the tissue located just below the phloem bundles,a portion of pericycle tissue above the protoxylem forming a complete and continuous wavy ring and later become circular.(Any one response) Or the diagrammatic sketch showing the formation of vascular cambium /cambium in dicot stem and dicot root give 2Scores	1	
11	a	Lysosomes	1	3
	b	The endoplasmic reticulum bearing ribosomes on their surface is called rough endoplasmic reticulum (RER)./its diagrammatic representation.	½	
		In the absence of ribosomes they appear smooth and are called smooth endoplasmic reticulum (SER)/its diagrammatic representation.	½	
		RER :-involved in protein synthesis and secretion./ They are extensive and continuous with the outer membrane of the nucleus.(any one function)	½	
		SER is the major site for synthesis of lipid./ In animal cells lipid-like steroidal hormones are synthesised in SER.(any one function)	½	

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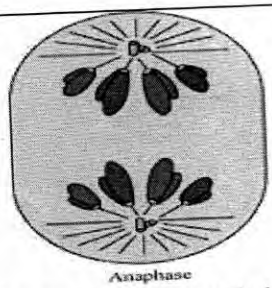
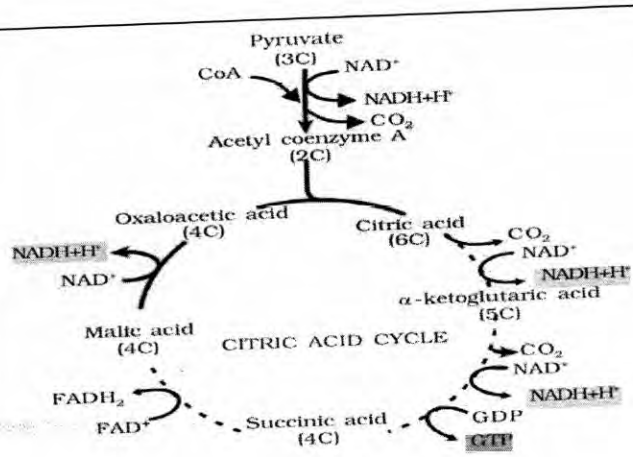
12		 Anaphase Centromeres split and chromatids separate. Chromatids move to opposite poles /the centromere of each chromosome is towards the pole/arms towards the equator/help in maintaining chromosome number of mother cell and daughter cells (any two correct responses)	1 1 1	3
13	a b	Cytoplasm(Cytosol) A.Glucose-6-phosphate B.Fructose -6- phosphate C. Fructose-1,6-bis phosphate D.1,3 bisphosphoglyceric acid/Triose bisphosphate E. 2-phosphoglycerate/2-phosphoglyceric acid F.Phosphoenol pyruvate/Phospho enolpyruvic acid **OR**	1 6x ½	4
13	a	Hans Krebs	1	
	b	 (Any six entry as the given diagram or the names of six compounds give full score 3)	½ x6	4
		TOTAL SCORE	30	30

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9. Mini Mathew
10. BABU MATHEW
11. ANITHA KUMARI. T.S.
12. Sisi Mini Alex
13. Joseph V.J

FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

SUBJECT : ZOOLOGY **CODE. NO:** 617 B

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1.		c) Kingdom – Phylum – Class – Order – Family – Genus – Species	1	1
2.		b) Tracheal system	1	1
3.		A - Specialised connective tissue B - Adipose tissue C - Irregular D - Cartilage.	½ × 4	2
4.		Phylum / Class | Common eg: | Unique features Pisces | Scoliodon | 2 chambered heart Mammals | Felis | Presence of hairs Arthropoda | Aedes | Open circulatory system OR a - Reptilia – any one example b - Ctenophora - " " c - Hemichordata - " "	½ × 6 ½ × 6	3 3
5		Aschelminthes / Nemathelminthes / Round Worms	1	1

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
6		Radial symmetry: Physalia, Adamsia Bilateral symmetry: Tape worm, Fasciola	½×4	2
7		Inspiration / Expiration • Diaphragm contracts / Diaphragm relaxes • Contraction of external intercostal muscles / Contraction of internal intercostal muscles • Thoracic Vol. increases / Thoracic vol. decreases • Intra pulmonary pressure decreases / Intra pulmonary pressure increases • Intake of fresh air/ O_2 / active process / Removal of used air/ CO_2 / passive process • Rib & Sternum raises / Ribs & Sternum lowers Any two points each	½×4	2
8	a)	A - Canine B - Molars	½×2	2
	b)	ii $\frac{2123}{2123}$	1	
9		A. Serine / Amino acid B. Adenylic acid / Nucleotide / AMP C - Cholesterol	1×3	3

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
10		Antibody - Sensory reception	1	1
11		A - Meromyosin B - Light Meromyosin / LMM	1×2	2
12	a)	ii) Corpus callosum	1	3
	b)	A - Axon / Axonite / pre synaptic - Neuron B - Synaptic Vesicle C - Synaptic cleft / Synaptic Gap. D - Neurotransmitters / example	½×4	
13		A - ANF (Atrial natriuretic factor) B - Hypoglycemic hormone / enhances cellular glucose uptake / decreases blood sugar level / Glycogenesis C - Kidney / JGA D - Thymosin	½×4	2
14	a)	iii) P-wave represent auricular depolarization	1	
	b)	A - Aorta, B - Venacava / Superior Venacava / Pre caval Vein C - Pulmonary Artery		

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		D - Chordae tendinae / Tricuspid - valve / Right Auriculo ventricular aperture	½ × 4	3
15		Prawn - Antennal gland Earthworm - Nephridia	½ × 4	2
				

617-B. HSE I. - Scheme finalisation Zoology - 2017 March

Sl.No	Name and Address	phone	signature
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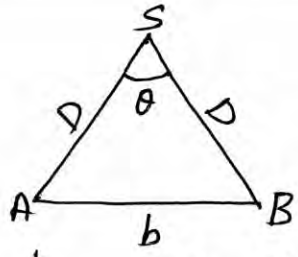
FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

SUBJECT : PHYSICS **CODE. NO: 615**

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
1		Viscous Force	1	1
2		Figure 2	1	1
3		Zeroth law of thermodynamics	1	1
4A		$\Delta l = \frac{FL}{YA}$ or $\Delta l = \frac{FL}{Y\pi a^2}$ or Any eqn related to Young's modulu $\therefore \Delta l = \frac{100 \times 10^3 \times 1}{2 \times 10^{11} \times 3.14 \times (10 \times 10^{-3})^2}$ $= 1.59 \times 10^{-3}$ m	1 ½ ½	2
4B		$G_1 = \frac{F}{A\theta}$ or $G_1 = \frac{FL}{A\Delta x}$ or Any eqn related to rigidity modulu $\therefore G_1 = \frac{(F/A) \times L}{\Delta x} = \frac{10^4 \times 10 \times 10^{-2}}{105 \times 10^{-2}}$ $= 0.2 \times 10^7$ N/m^2	1 ½ ½	2
5		Diagram of Hydraulic Lift $\frac{F_1}{A_1} = \frac{F_2}{A_2}$ If $A_2 > A_1$, then $F_2 > F_1$ or Pascal's Law ⇒ give one mark	1 ½ ½	2

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
6		$\vec{E} = \frac{3}{2} k_B T$ Here $T = [273 + 27] = 300K$ $\therefore \vec{E} = \frac{3}{2} \times 1.38 \times 10^{-23} \times 300$ $= 6.21 \times 10^{-25} J$ OR correct substitution of eqn give one mark. OR $\vec{E} = \frac{1}{2} k_B T \Rightarrow$ give one mark	1 $\frac{1}{2}$ $\frac{1}{2}$	2
7		Water has a maximum density at 4°C as its volume is minimum at 4°C As a lake cools towards 4°C, water near the surface becomes denser and sinks The warmer less dense water near the bottom rises and freezes OR Any two points give - 3 marks OR Any one point give - 2 marks	1 1 1	3
8		Isobaric process – Pressure constant – $P(V_2 - V_1)$ Isothermal process – Temperature Constant – $-\mu RT \ln \frac{V_2}{V_1}$ Adiabatic process – No Heat exchange between the system and surroundings – $\frac{R}{\gamma - 1}[T_1 - T_2]$ Any two correct OR matches give 3 marks	1 1 1	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
9	(a)		1	2
		Here $\theta = \frac{b}{D}$ or $D = \frac{b}{\theta}$	1	
	(b)	$[m] = [M]$ $[v] = [LT^{-1}]$ $[g] = [LT^{-2}]$ $[h] = [L]$	$1\frac{1}{2}$	4
		Any three correct Dimension eqn give $1\frac{1}{2}$ marks		
		$\therefore [M^1L^2T^{-2}] = [M^1L^2T^{-2}]$	$\frac{1}{2}$	
		OR Eqn is dimensionally correct. OR Statement is correct/true - give one mark		
10	(a)	II and III	2	2
	(b)	$H = \frac{u^2 \sin^2\theta}{2g}$	1	4
		$\therefore H = \frac{20^2 \times \sin^2 30}{2 \times 9.8} = 5.1\ m$	$\frac{1}{2}+\frac{1}{2}$	2
11	(a)	I	1	1
	(b)	$V_0 = \sqrt{\frac{g R_E^2}{(R_E+h)}}$ OR $V_0 = \sqrt{\frac{GM}{R+h}}$	1	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total	
		$V_o = \sqrt{\frac{9.8 \times (6400 \times 10^3)^2}{[6400 * 10^3 + 3400 \times 10^3]}}$	1	3	4
		$= 6400$ m/s	1		
		OR			
		Any other correct alternate method give full score			
12	(a)	II and III	2	2	
	(b)	A → Amplitude	1	2	4
		ω → Angular velocity or Angular frequency	1		
		OR			
		Definition only ($A\omega$) give full score			
13	(a)	3.0 cm or 3 cm	1	1	
		unit not necessary			
	(b)	Figure	1	3	4
		$\nu_1 = \frac{V}{2L}$	1		
		$\nu_2 = 2 \times \frac{V}{2L}$	1		
		OR			
		Figure only 2 marks			
14	(a)	Uniformly	1	1	
	(b)	Velocity at 1 s = 10 m/s	$\frac{1}{2}$	3	5
		Velocity at 2 s = 20 m/s	$\frac{1}{2}$		
		Graph - with correct marking of V & t	2		
	(c)	Displacement	1	1	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
15	(a)	Centripetal force is ~~produced by~~ Provided $\frac{mv^2}{R} = N\sin\theta + f\cos\theta$ — ① OR The diagram representing $N\sin\theta$ OR $f\cos\theta$ ~~$N\cos\theta$~~ $mg = N\cos\theta - \mu_s N\sin\theta$ — ②	1 1	4
		$\frac{①}{②} \Rightarrow \frac{\frac{mv^2}{R}}{mg} = \frac{N\sin\theta + f\cos\theta}{N\cos\theta - \mu_s N\sin\theta}$ $f = \mu_s N$ $\therefore V = \sqrt{Rg\left[\frac{\mu_s + \tan\theta}{1 - \mu_s \tan\theta}\right]}$ OR final eqn only - give 2 marks	1 $\frac{1}{2}$ $\frac{1}{2}$	5
	(b)	I	1	1
16	(a)	Kinetic energy	1	1
	(b)	$u=0,\ t=10s,\ F=20N,\ m=5kg$ $F=ma$ or $a=F/m$ $\therefore a = \frac{20}{5} = 4\ m/s^2$ OR $a = 4\ m/s^2$ - give 1 mark $V = u + at$ $V = 0 + 4\times10 = 40\ m/s$ OR $V = 40\ m/s$ only - give one mark.	$\frac{1}{2}$ $1/2$ $1/2$ $1/2$	

Qn No	Sub Qns	Answer Key/Value Points	Score	Total	
		$K = \frac{1}{2} m v^2$	$\frac{1}{2}$	3	5
		$\therefore K = \frac{1}{2} \times 5 \times 40^2 = 4 \times 10^3 J$	$\frac{1}{2}$		
		OR			
		$K = 4 \times 10^3 J$ only give 1 mark	1	1	
	(c)	True			
17A	(a)	II	1	1	
	(b)	$\frac{dL}{dt} = \frac{d}{dt}(\vec{r} \times \vec{p})$	2		
		$= \vec{r} \times \frac{d\vec{p}}{dt} + \frac{d\vec{r}}{dt} \times \vec{p}$	1	4	5
		$= \vec{\tau}$	1		
		OR			
		$\frac{d\vec{L}}{dt} = \vec{\tau}$ - give one mark			
17B	(a)	IV	1	1	
	(b)	Statement / fig with eqn	2		
		OR			
		fig only or eqn only give one mark.			5
		$I_z = I_{xx} + I_y$		4	
		Substitution $\frac{MR^2}{2} = I_D + I_D$	1		
		$\therefore I_D = \frac{MR^2}{4}$	1		

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
18A	(a)	Correct derivation of eqn of continuity OR aV = constant OR $a_1V_1 = a_2V_2$ OR mass of liquid flowing is equal to mass of liquid flowing out give 2 marks	4	5
	(b)	III	1	
18B	(a)	The pressure difference between the two sides of the top concave surface in the capillary tube is given by $P_i - P_o = \frac{2S}{a}\cos\theta$ —①	1	4
		$P_A = P_o + h\rho g = P_i$	1	
		$\therefore P_i - P_o = h\rho g$ —②		
		$\therefore h\rho g = \frac{2S\cos\theta}{a}$		
		i.e. $h = \frac{2S\cos\theta}{a\rho g}$	2	5
		OR Correct derivation give full score OR Equation $h = \frac{2S\cos\theta}{a\rho g}$ - give 2 marks-		
	(b)	III	1	1

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		1. Nancy Joseph		
		2. Caro Jose Lajan. J.		
		12 Mrudula. P. Nair		
		3. Ratheesh Kumar. R		
		4 Chithrangadan S.G		
		5 ASHRAFALI PANALI 9846652195		
		6 Johnson		
		7 Pradeep. O		
		8. Dinesh Kumar K		
		9. Mathew, George.		
		10 Hankuthman P 9496951456		
		11. Binu. P. J.		

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FIRST YEAR HIGHER SECONDARY EXAMINATION MARCH 2017

SUBJECT : MATHEMATICS (SCIENCE) **CODE. NO: 618**

Qn No	Sub Qns	Answer Key/Value Points		Score	Total
1	(a)	$\frac{1}{\sqrt{2}}$	1	1	
	(b)	$\cos x = \sqrt{1-\sin^2 x} = \sqrt{1-\frac{9}{25}} = -\frac{4}{5}$	$\frac{1}{2}$		
		$\sec x = \frac{-5}{4}$	$\frac{1}{2}$		
		$\tan x = -\frac{3}{4}$	$\frac{1}{2}$		
		$\cot x = \frac{-4}{3}$	$\frac{1}{2}$	2	
		Remarks: Alternate method give full score With out negative sign give $1\frac{1}{2}$ Score			
	(c)	$\sin 6x + \sin 2x - \sin 4x = 0$	$\frac{1}{2}$		6
		$2\sin 4x \cos 2x - \sin 4x = 0$	$\frac{1}{2}$		
		$\sin 4x (2\cos 2x - 1) = 0$	$\frac{1}{2}$		
		$\sin 4x = 0$ $(\frac{1}{2})$ $\quad \cos 2x = \frac{1}{2}$	$\frac{1}{2}$		
		$4x = n\pi$ $\quad \cos 2x = \cos\frac{\pi}{3}$			
		$x = \frac{n\pi}{4}$ $\quad x = n\pi \pm \frac{\pi}{6}$	$\frac{1}{2}$	3	
		OR			
	(a)	210	1	1	
	(b)	$\tan 75 = \tan(45+30)$	$-\frac{1}{2}$		
		$= \frac{\tan 45 + \tan 30}{1 - \tan 45 \tan 30}$	$-\frac{1}{2}$		
		$= \frac{1+\frac{1}{\sqrt{3}}}{1-\frac{1}{\sqrt{3}}} = \frac{\sqrt{3}+1}{\sqrt{3}-1}$	-1	2	
		* for formula give ½ score, Alternate method give full score * for direct answer give 1 score			
	(c)	$a\sin(B-C) = a[\sin B\cos C - \cos B \sin C]$	$-\frac{1}{2}$		
		$= a\left[bk\left(\frac{a^2+b^2-c^2}{2ab}\right) - ck\left(\frac{c^2+a^2-b^2}{2ac}\right)\right]$	-1		6

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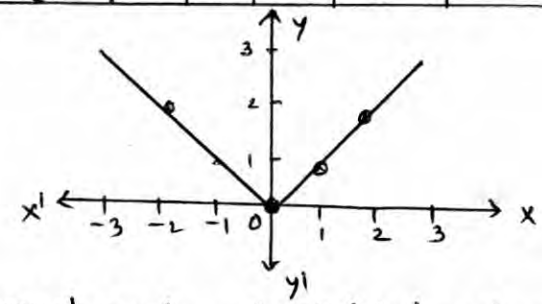
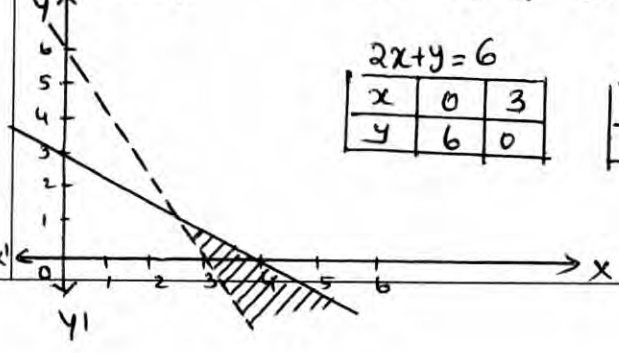
Qn No	Sub Qns	Answer Key/Value Points		Score	Total
		$= \frac{k}{2}\left[a^2+b^2-c^2-c^2-a^2+b^2\right]$	$\frac{1}{2}$		
		$= k\left[b^2-c^2\right]$			
		Similerly $b\sin(c-A) = k(c^2-a^2)$	$\frac{1}{2}$		
		$c\sin(A-B) = k(a^2-b^2)$	$\frac{1}{2}$	3	
	Remark:	$\therefore$ LHS $= 0$			
		for subtraction formula, sine formula, cosine formula give $\frac{1}{2}$ score each			
2	(a)	(ii) A	1	1	
	(b)	$A \cup B = \{a,b,c,d,e,f,g\}$			
	(i)	$A' = \{a,f,g\}$ $B' = \{b,d,e,f\}$	-1		
		$(A \cup B)' = \{f\}$, $A' \cap B' = \{f\}$	$\frac{1}{2}+\frac{1}{2}$	2	5
	(c)	$n(A \cup B) = 400$, $n(A) = 250$, $n(B) = 200$	1		
		$n(A \cap B) = n(A)+n(B)-n(A \cup B)$	$\frac{1}{2}$		
		$= 50$	$\frac{1}{2}$	2	
	Remark:	for analysing the problem give FULLSCORE			
3		Let $P(n) : 10^{2n-1}+1$ is divisible by 11			
		$P(1) = 10+1 = 11$, $P(1)$ is true	-1		
		Assume that $P(k)$ is true, $10^{2k-1}+1$ is $d(11)$	-1		
		$P(k+1) = 10^{2k+2-1}+1$	-1		
		$= 10^{2k-1} \cdot 10^2 + 1$			
		$= 10^{2k-1}[99+1]+1$			4
		$= 10^{2k-1} \cdot 99 + 10^{2k-1}+1 = d(11)$	-1		
		$\therefore P(k+1)$ is true		4	
4	(a)	(iii) $R - \{1\}$	1	1	
	(b)	$R = \{(1,6),(2,7),(3,8)\}$	1		
		domain $= \{1,2,3\}$ Range $= \{6,7,8\}$	1+1	3	
	Remark	for any correct two ordered pair give 1 score, corresponding domain and range give 2 score			

Qn No	Sub Qns	Answer Key/Value Points		Score	Total
	(c)				
		x | -2 | -1 | 0 | 1 | 2 $f(x)$ | 2 | 1 | 0 | 1 | 2	1		6
			1		
	Remark:	for correct graph with out tabular column give FULL SCORE		2	
5	(a)	(iii) -1	1	1	
	(b)	$a=\sqrt{3}$, $b=1$	$\frac{1}{2}$		
		$r=2$	$\frac{1}{2}$		
		$\tan\theta=\frac{1}{\sqrt{3}}$, $\theta=\frac{\pi}{6}$ or 30°	$\frac{1}{2}$		
		$z=2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$	$\frac{1}{2}$	2	
	Remark:	for formula give $\frac{1}{2}$ score each			
	(c)	$\sqrt{-8-6i} = x+iy$	$\frac{1}{2}$		
		$-8-6i = x^2-y^2+i2xy$	$\frac{1}{2}$		
		$x^2-y^2=-8$, $xy=-3$	$\frac{1}{2}$		6
		$x^2+y^2=10$	$\frac{1}{2}$		
		$x=\pm1$, $y=\pm3$	$\frac{1}{2}+\frac{1}{2}$	3	
		$\therefore \sqrt{-8-6i} = -1+i3$ or $1-i3$			
	Remark:	Alternate method give FULL SCORE for $(x^2+y^2)^2=(x^2-y^2)^2+(2xy)^2$ give $\frac{1}{2}$ score			
6	(a)	$2x > 3x+6$	1		
		$-x > 6$ or $x < -6$	1	2	
	(b)				
		$2x+y=6$ x | 0 | 3 y | 6 | 0			
		$3x+4y=12$ x | 0 | 4 y | 3 | 0	$\frac{1}{2}+\frac{1}{2}$		
			2	3	

Qn No	Sub Qns	Answer Key/Value Points		Score	Total
	Remark	• for each line give 1 score, • for correct line and incorrect region give $2\frac{1}{2}$ score • with out considering doted line give FULL SCORE • for drawing axes only give $\frac{1}{2}$ score			
7	(a)	(iii) 64	1	1	
	(b)	Number of ways $= {}^5P_2$ or 5×4	$1\frac{1}{2}$		
		$= 20$	$\frac{1}{2}$	2	
	(c)	$\frac{5!}{(5-r)!} = 2 \cdot \frac{6!}{(7-r)!}$	1		
		$\frac{5!}{(5-r)!} = \frac{2\times6\times5!}{(7-r)(6-r)(5-r)!}$	$\frac{1}{2}$		6
		$(7-r)(6-r) = 12$	$\frac{1}{2}$		
		$r^2 - 13r + 30 = 0$	$\frac{1}{2}$		
		$r = 10$ or 3	$\frac{1}{2}$	3	
		$r = 3$			
	Remark	for the formula ${}^nP_r$ give $\frac{1}{2}$ score			
		OR			
	(a)	17 (iii)	1	1	
	(b)	$12C_2 = 66$	$1\frac{1}{2}+\frac{1}{2}$	2	
	Remark	for ${}^nC_r$ give $\frac{1}{2}$ score			
	(c)	Total number of ways $= {}^{52}C_4$	1		
	(i)	number of ways $= 4 \times {}^{13}C_4$	1		6
		$= 2860$			
	Remark	for ${}^{13}C_4$ give $\frac{1}{2}$ score			
	(ii)	number of ways $= 2 \times {}^{26}C_4$	1	3	
		$= 29900$			
	Remark	for ${}^{26}C_4$ give $\frac{1}{2}$ score			
8	(a)	(iii) 0	1	1	
	(b)	$3y = -6x + 5$	$\frac{1}{2}$		
		$y = -2x + \frac{5}{3}$	$\frac{1}{2}$		

Qn No	Sub Qns	Answer Key/Value Points		Score	Total
		$m=-2, \quad c=5/3$	$\frac{1}{2}+\frac{1}{2}$	2	
	Remark	for $y=mx+c$ give ½ score, for finding direct slope and y intercept give 1 score			
	(c)	Let $(x,0)$ be the point			
		$\sqrt{(x-7)^2+36} = \sqrt{(x-3)^2+16}$	$\frac{1}{2}$		5
		$x^2-14x+49+36 = x^2-6x+9+16$	$\frac{1}{2}$		
		$-8x = -60, \quad x=15/2$	$\frac{1}{2}$		
		Point is $(15/2, 0)$	$\frac{1}{2}$	2	
	Remark	for distance formula give ½ score			
9	(a)	$a=6$	$\frac{1}{2}$		
		$y^2=4ax$	1		
		$y^2=24x$	$\frac{1}{2}$	2	
	(b)	$a=4, \; b=3, \; c=\sqrt{a^2+b^2}=5$	$\frac{1}{2}$		
		$e=\frac{c}{a}=\frac{5}{4}$	$\frac{1}{2}$		
		Length of transverse axes $=2a=8$	$\frac{1}{2}$		
		Length of conjugate axis $=2b=6$	$\frac{1}{2}$		5
		foci $=(\pm c, 0)=(\pm 5, 0)$	$\frac{1}{2}$		
		Vertices $(\pm a, 0)=(\pm 4, 0)$	$\frac{1}{2}$	3	
	Remark	For writing formule, give a maximum of 1½ score			
10	(a)	(i) $\frac{3}{2}$	1	1	
	(b)	$t_n=995, \; t_1=105, \; d=5$			
		$n=\frac{t_n-t_1}{d}+1=179$	$\frac{1}{2}$		
		$S_n=\frac{n}{2}[t_1+t_n]=98450$	$\frac{1}{2}$		
	Remark	Alternati method give FULLSCORE	$\frac{1}{2}+\frac{1}{2}$	2	6
		Using $a_1=100$, $a_n=1000$ and correctanswer give 1 score			
	(c)	$S=8+88+888+\cdots = 8[1+11+111+\cdots]$	½		
		$=\frac{8}{9}[9+99+999+\cdots] = \frac{8}{9}[(10+100+1000+\cdots)-(1+1+\cdots)]$			
		$=\frac{8}{9}\left[\frac{10(10^n-1)}{9}-n\right]$	$\frac{1}{2}+\frac{1}{2}$		
	Remark	for sum of GP give ½ score	1	3	
	(a)	(ii) $\frac{1}{64}$ OR	1	1	
	(b)	Let $\frac{a}{r}, a, ar$ be the numbers	½		
		$\frac{a}{r} \times a \times ar = -1 \quad \therefore a=-1$	½		

Qn No	Sub Qns	Answer Key/Value Points	Score	Total
		$\frac{a}{r}+a+ar = \frac{13}{12}$, $-1(1+r+r^2) = \frac{13r}{12}$ $\frac{1}{2}$		
		$12r^2+25r+12=0$, $r=\frac{-4}{3}$, or $\frac{-3}{4}$ $\frac{1}{2}+\frac{1}{2}$		
		numbers are $\frac{3}{4}, -1, \frac{4}{3}$ or $\frac{4}{3}, -1, \frac{3}{4}$ $\frac{1}{2}$	3	6
	(c)	$t_n = (2n+1)n^2 = 2n^3+n^2$ 1		
		$\Sigma t_n = 2\Sigma n^3 + \Sigma n^2 = 2\frac{n^2(n+1)^2}{4} + \frac{n(n+1)(2n+1)}{6}$ $\frac{1}{2}+\frac{1}{2}$	2	
		$= \frac{n(n+1)}{2}\left[n(n+1)+\frac{2n+1}{3}\right]$		
	Remark	for writing the formula for Σn^2, Σn^3, give $\frac{1}{2}$ score each		
11	(a)	(iii) 11 1	1	
	(b)	$a=x$, $b=\frac{1}{x}$, $n=10$		
		$T_{r+1} = {}^nC_r a^{n-r} b^r = {}^{10}C_r x^{10-2r}$ $\frac{1}{2}+\frac{1}{2}$		3
		$10-2r=0$, $r=5$ $\frac{1}{2}+\frac{1}{2}$		
		the term is ${}^{10}C_5 = 630$	2	
12	(a)	(ii) $\sqrt{19}$ 1	1	
	(b)	Let C be (x_3, y_3, z_3)		
		$\left(\frac{3-1+x_3}{3}, \frac{-5+7+y_3}{3}, \frac{7-6+z_3}{3}\right) = (1,2,3)$ $\frac{1}{2}$		3
		$2+x_3=3$ $2+y_3=6$ $z_3+1=9$		
		$x_3=1$ $y_3=4$ $z_3=8$ $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$	2	
		C is $(1,4,8)$		
	Remark	formula for centroid give ½ score		
13	(a)	(ii) 1 1	1	
	(b)	$\lim_{x\to 0}\frac{\sqrt{1+x}-1}{x} = \lim_{y\to 1}\frac{y^{\frac{1}{2}}-1^{\frac{1}{2}}}{y-1}$ $1+x=y$ $x\to 0, y\to 1$ 1		
		$= \frac{1}{2}$ 1	2	
	Remark	for alternati method give FULLSCORE, $\lim_{x\to a}\frac{x^n-a^n}{x-a}=na^{n-1}$ give ½ score.		
	(c)	$f'(x) = \lim_{h\to 0}\frac{f(x+h)-f(x)}{h} = \lim_{h\to 0}\frac{\sin(x+h)-\sin x}{h}$ $\frac{1}{2}+\frac{1}{2}$		
		$= \lim_{h\to 0}\frac{2\cos\left(\frac{x+h+x}{2}\right)\sin\left(\frac{x+h-x}{2}\right)}{h}$ 1		

Qn No	Sub Qns	Answer Key/Value Points		Score	Total
		$= \lim_{h\to 0} \frac{2\cos\left(x+\frac{h}{2}\right)\sin\frac{h}{2}}{h} = \cos x$	$\frac{1}{2}+\frac{1}{2}$	3	
	Remark	for direct answer give 1 Score			
14	(a)	If a number is not divisible by 3 then it is not divisible by 9	1	1	
	(b)	Assume that $\sqrt{5}$ is rational, $\sqrt{5}=\frac{a}{b}$ a and b have no common factors	1		4
		$a^2=5b^2 \Rightarrow$ 5 divides a	1		
		$a=5k$, $a^2=25k^2$, $5b^2=25k^2$, $b^2=5k^2$ $\Rightarrow$ 5 divides b	1		
		It is a contradiction, our assumption is wrong	1	3	
15	(a)	(i) $\frac{3}{4}$	1		
		(ii) $\frac{1}{2}$ (for any answer give 1 Score)	1		
		(iii) 1	1	3	
	(b)	$n(S)=36$	1		
	(i)	$n(A)=6$, $P(A)=\frac{1}{6}$	$\frac{1}{2}$		
	Remark	For writing $\{(1,1),(2,2)(3,3)(4,4)(5,5)(6,6)\}$ give ½ Score	$\frac{1}{2}$		5
	(ii)	$n(B)=5$	$\frac{1}{2}$		
		$P(B)=\frac{5}{36}$			
	Remark	$B=\{(2,6)(3,5)(4,4)(5,3)(6,2)\}$ give ½ score for writing the sample space S give ½ Score	$\frac{1}{2}$	2	
16	(a)	$\Sigma x = 30$, $\bar{x}=\frac{\Sigma x}{n}=6$	$\frac{1}{2}+\frac{1}{2}$		
		$\Sigma x^2=220$, $\sigma^2=\frac{\Sigma x^2}{n}-(\bar{x})^2=\frac{220}{5}-36=8$,	$\frac{1}{2}+\frac{1}{2}$	2	
	Remark	for writing correct formula for variance give ½ Score			
	(b)				5

x	f	fx	$\lvert x-\bar{x}\rvert$	$f\lvert x-\bar{x}\rvert$
5	7	35	9	63
10	4	40	4	16
15	6	90	1	6
20	3	60	6	18
25	5	125	11	55
	25	350		158

1

$\bar{x}=\frac{\Sigma fx}{N}=\frac{350}{25}=14$ $\frac{1}{2}+\frac{1}{2}$

$MD(\bar{x})=\frac{\Sigma f\lvert x-\bar{x}\rvert}{N}=\frac{158}{25}=6.32$ $\frac{1}{2}+\frac{1}{2}$ 3

Remark Alternate method give FULL SCORE

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