SUBJECT : ACCOUNTANCY (SET-I)

Time : 3 Hrs. M.M.: 90

Instructions :

(i) Marks for each question are indicated against it.

(ii) All parts of a question should be attempted at one place.

(iii) Show working notes clearly.

Q1. How will you treat the following items while preparing the final accounts of non-profit organisations? (1)

(a) Specific Donation (b) Entrance Fees

Q2. What is meant by Deferred Revenue Expenditure? (1)

Q3. Give any two objectives of accounting. (1)

Q4. Building is shown at its market price rather than its cost of purchase. Which accounting principle is violated in the above statement? (1)

Q5. What is utility software? (1)

Q6. Why is Trial Balance not a conclusive proof of accuracy of books of accounts? (1)

Q7. Calculate closing stock from following details : (3)
opening stock = ₹ 20,000; cash sales = ₹ 60,000; credit sales = ₹ 40,000; Purchases = ₹ 70,000 and rate of gross profit on cost is 33⅓%.

Q8. From the following information, calculate the amount of stationery to the debited to Income and Expenditure Account for the year ending on 31st March, 2013 : (3)

	(₹)
Stock of stationery on 1st April, 2012	5,500
Creditors for stationery on 1st April, 2012	4,000
Advance paid for stationery on 31st March, 2012	1,000
Amount paid for stationery during the year 2012-13	12,000
Stock of stationery on 31st March, 2013	2,500
Creditors for stationery on 31st March, 2013	1,200

Q9. Distinguish between Receipts and Payments Account and Cash Book on following basis : (3)

(a) Period (b) Institutions

(c) Sides

Q10. Explain briefly the objectives of accounting standards. (3)

Q11. Enter the following transactions in Purchase Book and Sales Book of M/s Khanna Garments : (3)

2014

Sept. 4 Purchased a computer for office use from M/s Hari Tech. ₹ 30,000 as per Invoice No. 207

Sept. 9 Sold to M/s Om & Sons on credit as per Invoice No. 182

72 Kurtas @ ₹ 175 each

45 Trousers @ ₹ 220 each

Less Trade Discount @ 5%

Sept. 11 Purchased from Jain Bros. as per Invoice No. 180

70 pair Socks @ ₹ 18 each

90 skirts @ ₹ 130 each

Less Trade Discount @ 10%

Sept. 15 Sold to Deepti & Co. as per Invoice No. 282

50 Long Shirts @ ₹ 185 each

65 Jeans @ ₹ 235 each

Sept. 20 Purchased from Verma & Co. as per Invoice No. 261

65 T-shirts @ ₹ 115 each

80 Trousers @ ₹ 180 each

Less Trade Discount 20%

Sept. 25 Sold to M/s Gupta & Sons for cash as per Invoice No. 173

20 Ladies Suits @ ₹ 115 each

30 T-shirts @ ₹ 405 each

Less Trade Discount @ 5%

Q12. (a) Define Readymade Software.

(b) Distinguish between Manual accounting process and Computerised accounting process (any three basis). (1½+1½=3)

Q13. Sunder does not maintain any books of accounts. He furnishes following information : (4)

	1st April, 2014 (₹)	31st March, 2015 (₹)
Cash	5,000	9,000
Computers	20,000	20,000
Stock	8,300	9,200
Machinery	3,50,000	3,50,000
Sundry Debtors	52,000	48,000
Sundry Creditors	70,000	90,000
Bills Receivable	—	800
Bills Payable	16,000	35,000

Sunder introduced ₹ 30,000 as additional capital. He withdrew ₹ 60,000 from his business for his personal use. Computers and machinery to be depreciated @ 10% p.a. Provision for doubtful debts to be created @ 10%. It was found that ₹ 5,000 from debtor were irrecoverable. Calculate profit or loss sustained for the year ending 31st March 2015.

Q14. Fill in the missing information/figures : (4)

JOURNAL

Date	Particulars		L.F.	Debit (₹)	Credit (₹)
2015					
April 2	.....	Dr.		2,50,000	
	.....	Dr.		.....	
	To				.....
	(Being 5 Televisions purchased and VAT paid @ 3%)				
April 18	.....	Dr.		.....	
	To				.....
	(Being interest on drawings charged @ 5% on ₹ 15,000)				

April 19	.....	Dr.		.....	
	To ..... A/c				.....
	To Discount Received A/c				1,500
	(Being cash purchases and 15% cash discount received)				
April 22	.....	Dr.		.....	
	To				.....
	(Being salaries of ₹ 15,000 due to accountant)				

Q15. Explain the following concepts/conventions briefly : (4)

(a) Conservatism principle

(b) Business entity concept

Q16. (a) Jindal Steel Ltd. has a policy to provide 10% job reservation for the children of employees. It is also running a co-educational English medium school for children of employees of company and for residents of nearby area. Indicate values involved in policy of the company.

(b) A sole proprietorship firm decided to select 5 children from poor families and decided to sponsor their free education in a privately managed school. Accordingly, it selected 3 girls and 2 boys. Which values do firm wish to promote by taking this decision? (2+2=4)

Q17. Describe briefly any four advantages of computerised accounting. (4)

Q18. Give journal entries to rectify the following errors.

(a) Cash received from Umesh ₹ 20,000 was posted to Rajesh as ₹ 2,000.

(b) Goods returned by Hardeep ₹ 5,000 were taken into stock. No entry was recorded in the books.

(c) Wages paid for installation of machinery ₹ 200 was posted to wages account.

(d) Purchase Book undercast by ₹ 3,500.

(e) Cash received from Deepak ₹ 10,000 was posted to his account as ₹ 1,000.

(f) Amount payable to Shree Kripa for repairs done to computers ₹ 4,500 and computer supplied for ₹ 37,500 were entered in the Purchase Book as ₹ 40,000. (6)

Q19. Record the following transactions in Cash Book with Bank and Discount columns in books of Manohar Lal & Sons : (6)

2015		(₹)
Jan. 1	Balance of cash	2,17,000
	Bank Balance	35,000
Jan. 3	Shares of XYZ Ltd. were sold at 20% less than the face value (face value ₹ 50,000)	
Jan. 5	Paid to Rachit by Cheque	9,800
	Discount received	200
Jan. 6	Received a cheque from Sanjeev in full settlement of a claim of ₹ 70,000	66,700
Jan. 7	Custom duty paid	3,000
Jan. 10	Deposited Sanjeev's cheque into bank	
Jan. 13	Payment made to Naveen	31,000
	discount allowed by him	1,000
Jan. 20	Cash withdrawn for private use	6,500
Jan. 22	Bank charges	200
Jan. 24	Brokerage paid	1,500
Jan. 27	Paid into Bank	20,000
Jan. 31	Sanjeev's cheque dishonoured	

Q20. X Ltd. purchased a plant on 1st January, 2011 for ₹ 60,000. It bought another plant on 1st April, 2012 for

₹ 40,000. On 1st October, 2013, plant bought on 1st January 2011 was sold for ₹ 40,000 and a fresh plant was purchased for ₹ 30,000 on the same date.

Depreciation is charged @ 10% p.a. on diminishing balance method. Show the plant account for three years assuming accounts are closed on 31st December each year. (6)

Q21. Prepare a Bank Reconciliation Statement from the following particulars on 31st March, 2010 : (6)

		(₹)
(i)	Debit Balance as per bank column of cash book	5,620
(ii)	Cheque issued to creditor but not yet presented to bank for payment	2,400
(iii)	Interest collected on securities by the bank, but not entered in the cash book	1,300
(iv)	Interest allowed by the Bank	400
(v)	Cheques deposited into bank for collection, but not yet collected by bank	4,150
(vi)	Bank charges	200
(vii)	A cheque deposited into bank was dishonoured, but no intimation was received	800

Q22. P sells goods for ₹ 5,000 to Q on 1st January, 2014 and draws a bill on the same day for three months. Q accepts it and returns it to P, who discounts it on the same date with his bank at 6% per annum. The acceptance is dishonoured on the due date and the noting charges were paid by bank being ₹ 50. On 4th April, 2014, Q accepts a new bill at four months for the amount then due to P together with interest at 12% per annum.

Pass journal entries to record these transactions in books of P & Q. (6)

Q23. The following balances were extracted from books of Kumar on 31st December, 2014 :

Name of Accounts	Dr. Balance (₹)	Cr. Balance (₹)
Capital	—	41,600
Drawings	9,000	
General Expenses	3,500	
Machinery	15,000	
Furniture	8,000	
Sundry Creditors	—	12,500
Trade Expenses	300	
Bad debts	500	
Bank overdraft	—	10,500
Stock (1.1.2014)	20,200	
Direct Expenses	3,400	
Taxes and Insurance	3,000	
Wages	9,000	
Sundry Debtors	16,200	
Sales	—	85,000
Purchases	53,000	
Scooter	5,000	
Scooter Expenses	500	
Bad debts provision	—	900
Commission	—	2,000
Bill Receivable	3,500	
Bills Payable	—	4,500
Bank	6,900	—
	1,57,000	1,57,000

Adjustments :

(i) Stock on 31st December 2014 was valued at ₹ 24,500.

(ii) Provide ₹ 500 for outstanding interest on bank overdraft.

(iii) Prepaid insurance is to the extent of ₹ 250

(iv) Write off further Bad debts of ₹ 200 and maintain the provision of bad debts at 5% on debtors.

(v) Depreciate machinery at 10% p.a. (8)

OR

Prepare Trading and Profit and Loss A/c for the year ending 31st December, 2014 and a Balance Sheet as on that date from the following Trial Balance of Rajesh Kumar

TRIAL BALANCE

Dr. Balance	(₹)	Cr. Balance	(₹)
Purchases	1,20,000	Sales	2,06,500
Returns inwards	2,000	Returns outward	400
Bank	10,000	Capital	50,000
Stock at commencement	30,400	Commission	2,500
Wages	20,700	Provision for Bad debts	2,000
Machinery	30,000	Loan	10,000
Debtors	25,400	Creditors	28,400
Furniture	10,000	Discount	1,200
Repairs	3,000		
Bad debts	1,500		
Interest on Loan	600		
Salaries	10,000		
Sales Tax	2,400		
Freight and Carriage	4,500		
Life Insurance Premium	2,000		
Donation	500		
Rent and Insurance	4,000		
Advertisement	24,000		
	3,01,000		3,01,000

Adjustments

(i) Stock on 31st December, 2014 was ₹ 36,600

(ii) Provide 10% depreciation on machinery.

(iii) Salaries were paid for 10 months.

(iv) Further Bad debts ₹ 400 and provide provision for Bad debts on Debtors @ 5%.

(v) Insurance premium ₹ 1,200 is paid for the year ending 31st March, 2015. (8)

Q24. The Receipts and Payments Account of Delhi Football club for the year ending 31st March 2007 was as under :

Receipts	₹	Payments	₹
To Balance b/d	48,000	By Purchase of Balls	80,000
To Subscriptions	2,46,000	By Tournament Expenses	10,000
To Interest	2,000	By Affiliation Fees	2,000
To Sale of Furniture	10,000	By Rent on Playground	5,000
To Donation for club Building	60,000	By Refreshment Expenses	4,000
		By Travelling Expenses	30,000
		By Investments	1,00,000
		By Salaries	12,000
		By Misc. Expenses	8,000
		By Balance c/d	1,15,000
	3,66,000		3,66,000

Prepare club's Income and Expenditure Account and Balance Sheet for the year ending at 31st March 2007, after taking into account the following adjustments :

(i) Subscriptions received include ₹ 10,000 for the year 2005-06 and ₹ 8,000 for the year 2007-08, ₹ 16,000 are still outstanding as subscription for the year 2006-07.

(ii) The book value of furniture sold was ₹ 14,000.

(iii) Salary oustanding for the year 2006-07 ₹ 5,000.

(iv) Stock of balls on 31st March 2007 was ₹ 4,000. (8)

OR

Following is the Receipts and Payments Account of Indian Youth Association for the year ended 31st March, 2014.

Receipts and Payment A/c

Receipts		₹	Payments		₹
To Balance b/d			By Salaries		30,000
in Hand	2,500		By Rent		6,000
at Bank	24,500	27,000	By Printing & Stationery		1,500
To Subscriptions		40,000	By Postage		400
To Bank Interest		200	By Typewriter Purchased		4,000
To Sale of old car		4,000	By Investments		8,000
			By Balance c/d		
			in Hand	1,300	
			at Bank	20,000	21,300
		71,200			71,200

Investments were purchased on 1st October, 2013 and yielded interest @ 5% p.a. Subscriptions included ₹ 8,000 for the year ended 31st March 2013 and ₹ 4,000 for the year ending 31st March 2015. Subscriptions for the year ended 31st March 2014 ₹ 8,000 were still in arrear. Rent for March 2014 ₹ 500 is still unpaid. The Book value of car was ₹ 5,500.

Prepare Income and Expenditure Account and Balance Sheet for the year ended 31st March 2014. (8)

SUBJECT : BUSINESS STUDIES (SET-I)

Time : 3 Hrs. M.M.: 90

General Instructions :

(i) Answers to questions carrying 1 mark may be answered in one word to one line.

(ii) Answers to questions carrying 3 marks should not exceed 75 words.

(iii) Answers to questions carrying 4-5 marks should not exceed 150 words.

(iv) Answer to questions carrying 6 marks should not exceed 200 words.

Q1. Ramesh has a computer shop and sells and repairs computers on a regular basis. Name and explain the feature of business mentioned here. (1)

Q2. State any one consequence of non-registration of a partnership firm. (1)

Q3. Government of India has contracted with a private sector company to construct a bridge on a river and to collect toll tax from vehicles passing through the bridge. Mention the type of arrangement that has been made between the government and the company. (1)

Q4. Give any two examples of application of 'B2B' commerce. (1)

Q5. What is the parameter used by the government to identify manufacturing enterprises as per MSMED Act, 2006? (1)

Q6. Define 'UPC'. (1)

Q7. Name the quotation which an exporter sends to the importer in response to a trade enquiry. (1)

Q8. What do you mean by 'Licensing'? (1)

Q9. What is that enterprise called which exercises centralised control from its headquarters in one country over the branches operating in several other countries? Also, explain its basic characteristics. (3)

Q10. Explain the following briefly : (3)

(a) Second-hand goods shops

(b) Cheap Jacks

Q11. Aditya gets his house insured against fire of ₹ 10 lakh with insurer A and for ₹ 5 lakh with insurer B. Due to fire, a loss of ₹ 3 lakh occured. How much compensation can be claimed from A and B? Why? Explain the related principle. (3)

Q12. Explain GDRs as an international source of business finance. (3)

Q13. What purpose is served by retailers to wholesalers and manufacturers? (3)

Q14. Gurpreet, Subhash and Poonam are partners in a garment manufacturing firm which is planning to manufacture bags for utilisation of waste materials. However, Poonam wants that her relation with the firm should not be known to the general public. They also decide to donate 10% of their revenue to a nearby orphanage.

(a) Which type of economic activity is this partnership firm doing?

(b) Mention the type of partner Poonam is.

(c) List any two values reflected in the above case. (3)

Q15. "No business is risk free". In the light of this statement, explain the concept of business risks and their causes. (4)

Q16. "The basic rationale of public sector has changed significantly". In the light of this statement, explain the role of public sector after the 'New Industrial Policy, 1991'. (4)

Q17. Shubham Ltd. has decided to expand its production capacity by modernising its plant and machinery at an estimated cost of ₹ 2 crores. It has adequate reserves to finance the expansion. As a finance manager of the company, give any four reasons for choosing the above source of business finance. (4)

Q18. Mention the name and explain the features of that store which has a number of units in the same building selling different types of commodities. (4)

Q19. 'In the absence of proper control, risks in online business transactions emerge from unauthorized access by certain people'. How? Also, explain other types of e-business risks. (4)

Q20. All the members of a company sitting in a general meeting were killed by a bomb. Will the company be wound up? Why? Also, explain any three limitations of a company form of organisation. (5)

Q21. Associations of business and industrial houses are formed to promote and protect internal trade. Name

any two of such associations and explain the functions performed by them. (5)

Q22. Discuss the role of small scale enterprises with special reference to rural India. (5)

Q23. "The preparation of Memorandum of Association with suitable clauses is necessary in the formation of a company". Explain any five such clauses. (5)

Q24. Ms. Pooja has started a new readymade garment manufacturing unit. She decides to open a new account in a nationalised bank but does not have a clear idea about the type of account that is suitable to business people like her. Which type of account do you suggest for her? Why? Also explain the other types of bank accounts. (6)

Q25. 'In spite of the dominant role of profit in the running of business today, business is fulfilling its social responsible towards its shareholders, employees and customers'. Illustrate with reasons. (6)

Q26. Why do some companies prefer to raise capital by issue of preference shares? Also, discuss its limitations. (6)

Q27. Rekha Garments has placed an order to import 2000 men's trousers from Swift Exports Ltd. located in Australia. Discuss the steps that it would need to undergo further for importing the shirts. (6)

SUBJECT : ECONOMICS [SET-II]

Time : 3 hrs. M.M. : 90

General Instructions :

(i) All questions in all the three sections are compulsory.

(ii) Marks for questions are indicated against each.

(iii) Question numbers 1-5 and 14-18 are very short answer questions carrying 1 mark each. They are required to be answered in one sentence.

(iv) Question numbers 6-8 and 19-21 are short answer questions carrying 3 marks each. Answer to them should not normally exceed 60 words each.

(v) Question numbers 9-10 and 22-23 are also short answer questions carrying 4 marks each. Answer to them should not normally exceed 70 words each.

(vi) Question numbers 11-13 and 24-26 are long answer questions carrying 6 marks each. Answer to them should not normally exceed 100 words each.

(vii) Section-C consists of questions based on OTBA.

(viii) Answer should be brief and to the point and the above word limit should be adhered to as far as possible.

SECTION-A (Statistics for Economics)

Q1. If the value of two series move in the same direction, the correlation is said to be _____. (Choose the correct alternative) (1)

(a) Negative (b) Positive

(c) Zero (d) None of the above

Q2. Ten players of Australian team made an average of 63 runs and ten players of Indian team made an average of 77 runs. The average runs made by both the team were : (Choose the correct alternative) : (1)

(a) 60 (b) 80

(c) 70 (d) 90

Q3. Choose the correct alternative : (1)

(a) Lorenz curve is the graphic method of measuring dispersion.

(b) More Lorenz curve is away from the line of equal distribution, the greater is the dispersion.

(c) More Lorenz curve is away from the line of equal distribution, lesser is the dispersion.

(d) Both (a) and (b)

Q4. State any two limitations of index numbers. (1)

Q5. State any one mathematical property of standard deviation. (1)

Q6. Calculate Mean Deviation from median from the following data : (3)

x :	1	2	3	4	5
f :	10	20	30	40	50

Q7. State any three uses of wholesale price index. (3)

Q8. Tabulate the information given below :

For a job interview in an IT firm in 2012, out of a total of 200 applicants, 120 were engineers. The number of girls was 75, out of which 33 were non-engineers. For the same interview in 2014, the total number of applicants was 350 out of which 220 were boys. The number of non-engineers was 110 of which 61 were girls. (3)

OR

Present the following information using a pie diagam : (3)

Items :	Food	Clothing	Rent	Miscelleneous
Total Expenditure (₹)	600	500	700	200

Q9. Marks scored in Statistics and Accountancy by ten students are given below : (4)

Marks in Statistics	15	20	28	12	40	60	20	80
Marks in Accountancy	40	30	50	30	20	10	30	60

Calculate coefficient of rank correlation.

OR

Calculate the coefficient of correlation between X and Y series from the following data by using direct method. (4)

X :	1	2	3	4	5
Y :	3	4	6	7	10

Q10. Locate mode graphically : (4)

Marks (mid points)	5	15	25	35	45	55	65
No. of students	5	10	20	25	20	10	5

Q11. Calculate arithmetic mean and standard deviation for the following data (Take Assumed Mean as 70) : (6)

Marks	20-40	40-60	60-80	80-100	100-120
No. of students	3	6	19	12	10

Q12. (a) Distinguish between census survey and sample survey.

(b) Mention any three limitations of statistics. (3+3=6)

OR

(a) Explain the concept of multi-stage sampling with the help of an example.

(b) Distinguish between 'primary data' and 'secondary data'. (3+3=6)

Q13. Calculate Quartile Deviation from the following data : (6)

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	3	2	4	5	2	4

SECTION-B (Indian Economic Development)

Q14. Tick mark the correct statement : (1)

(a) Britain had monopoly control over India's foreign trade during the colonial period.

(b) India was exporter of consumer goods during the British rule in India.

(c) Adequate efforts were made by the colonial regime to improve infrastructure facilities in India.

(d) Adequate efforts were made by the colonial regime to improve agricultural productivity in India.

Q15. The structural reforms that were taken up by government in 1991 to overcome foreign exchange crisis in India included : (Choose the correct alternative) (1)

(a) devaluation of rupee
(b) abolition of industrial licensing
(c) import substitution policy
(d) increasing role of public sector

Q16. Transfer of ownership and management of public sector companies from the government to the private sector is known as : (Choose the correct alternative) (1)

(a) Liberalisation (b) Globalisation
(c) Privatisation (d) Disinvestment

Q17. State any one advantage of formal sector establishment over informal sector establishment. (1)

Q18. State any one argument in favour of 'Agricultural Subsidy Policy'. (1)

Q19. Explain the foreign trade policy in India before 1991. (3)

Q20. RBI plays a major role in controlling inflation in India. Explain any two measures used to control inflation in India. (3)

Q21. Write a short note on drain of India's wealth during the British rule. (3)

OR

Discuss the main reasons for India's agricultural stagnation during the colonial period. (3)

Q22. Explain various land reforms implemented in the agricultural sector by the government. (4)

OR

Explain the main features of the Industrial Policy Resolution of 1956. What objectives did it aim to achieve in the industrial sector? (4)

Q23. Give a brief account of the industrial sector reforms introduced in India since 1991. (4)

Q24. (a) 'The power sector plays an important role in the development process of a nation'. Elucidate some of the challenges facing the power sector in India.

(b) Why did the poverty alleviation programmes achieve only limited success in India? (3+3=6)

Q25. (a) Explain the arguments in favour of new economic policy.

(b) Do you think India has benefitted from 'outsourcing' by the developed countries? Give reasons in support of your answer. Why are the developed countries opposing it? (3+3=6)

Q26. (a) Define agricultural diversification. Discuss horticulture as a source of agricultural diversification.

(b) Discuss the various reasons for environmental crisis. (3+3=6)

OR

(a) Explain the various measures adopted by the government of India to improve the system of agricultural marketing.

(b) How is health a source of human capital formation? (3+3=6)

SUBJECT : MATHEMATICS (SET-II)

Time : 3 Hrs. M.M.: 100

General Instructions :

(i) Read all questions carefully.

(ii) The question paper consists of 26 questions divided into three sections - A, B and C.

(iii) Section-A comprises of 6 questions of 1 mark each, Section-B comprises of 13 questions of 4 marks each and Section-C comprises of 7 questions of 6 marks each.

(iv) There is no overall choice. However, internal choice has been given in 4 questions of 4 marks each and 2 questions of 6 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of calculators is not allowed.

SECTION-A

Q1. Evaluate : $\sin(40°+\theta)\cos(50°-\theta) + \cos(40°+\theta)\cdot\sin(50°-\theta)$

Q2. Find the modulus of : $\dfrac{(2-3i)^2}{-1+5i}$

Q3. Find the contrapositive of : If x is an even number then x^2 is divisible by 4.

Q4. The fourth term of A.P. is equal to 3 times its first term and seventh term exceeds twice the third term by 1. Find the first term.

Q5. In how many ways one can select a cricket team of 11 players from 15 players if one of them, who is in bad form, must always be excluded.

Q6. Find the equation of the parabola with vertex at origin and directrix $y + 3 = 0$

SECTION-B

Q7. Using PMI, prove that

$$1.3 + 2.3^2 + 3.3^3 + \ldots\ldots + n.3^n = \frac{(2n-1)\,3^{n+1} + 3}{4} \text{ for all } n \in N.$$

Q8. Find the coefficient of x^{17} in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$

Q9. Find the square root of : -7 - 24i

Q10. Two dice are thrown simultaneously. Find the probability of getting (i) a total of atmost 9 (ii) sum of the numbers on the two faces is divisible by 3 or 4.

Q11. If U = {2, 3, 4, 5, 6, 7, 8, 9, 10, 11}, A = {2, 4, 7}, B = {3, 5, 7, 9, 11} and C = {7, 8, 9, 10, 11}, then verify $A - (B \cup C) = (A - B) \cap (A - C)$

Q12. Find the sum of n terms of series :

$$\frac{1}{1\times 2} + \frac{1}{2\times 3} + \frac{1}{3\times 4} + \ldots\ldots$$

OR

If S_n denotes the sum of n terms of an A.P. and $S_1 = 6$ and $S_7 = 105$, then show that $S_n : S_{n-3} = (n + 3) : (n - 3)$

Q13. Solve : $2\cos^2 x + 3\sin x = 0$

Q14. Find the equation of a line which passes through the point of intersection of $3x + y - 7 = 0$ and $x + 2y + 5 = 0$ and is perpendicular to the line $5x - 2y + 6 = 0$

Q15. Three students are standing in a park with signboards "SAVE ENVIRONMENT", "DON'T LITTER", "KEEP YOUR PLACE CLEAN". Their positions are marked by the points A (0, 7, 10), B (–1, 6, 6) and C (–4, 9, 6). The three students are holding GREEN coloured ribbon together. Does the ribbons form sides of a right angled triangle? Do you feel the need to promote? What message is given from this question to the society?

Q16. A five digit number is formed at random by using the digits 1, 2, 3, 4, 5, 6, 7 and 0. Find the probability that the number formed has none of its digit repeated.

Q17. Find the derivative of $\cot(x^2 + 1)$ using first principle.

OR

Find the derivatives of :

(i) $f(x) = \cos\sqrt{x}$ (ii) $f(x) = \sqrt{\frac{1 - \cos 2x}{1 + \cos 2x}}$

Q18. Find the equation of the ellipse whose axes are along the coordinate axes, vertices are $(\pm 5, 0)$ and foci at $(\pm 4, 0)$

OR

The distance between the foci of a hyperbola is 16 and its eccentricity is $\sqrt{2}$. Find its equation.

Q19. A group consists of 4 girls and 7 boys. In how many ways can a team of 5 members be selected, if the team has (i) no girl (ii) atleast one boy and one girl?

OR

How many words each of 3 vowels and 2 consonants can be formed from the letters of the word INVOLUTE?

SECTION-C

Q20. (i) Let $f(x) = x - \frac{1}{x}$, prove that $[f(x)]^3 = f(x^3) + 3f\left(\frac{1}{x}\right)$

(ii) Find the domain and range of $3 - |2x + 5|$

Q21. Find the equation of a circle which passes through the centre of the circle $x^2 + y^2 + 8x + 10y - 7 = 0$ and is concentric with the circle $2x^2 + 2y^2 - 8x - 12y - 9 = 0$.

OR

Prove that the product of lengths of perpendicular drawn from the points $\left(\sqrt{a^2 - b^2}, 0\right)$ and $\left(-\sqrt{a^2 - b^2}, 0\right)$ to the line $\frac{x}{a}\cos\theta + \frac{y}{b}\sin\theta = 1$ is b^2.

Q22. Find the mean, variance and standard deviation for the following data :

Class Interval	Frequency
0-10	3
10-20	2
20-30	4
30-40	6
40-50	5
50-60	5
60-70	5
70-80	2
80-90	8
90-100	5

Q23. The sum of two numbers is 6 times their geometric means, show that the numbers are in the ratio $(3+2\sqrt{2}) : (3-2\sqrt{2})$

Q24. (i) Evaluate : $\lim_{x \to \pi/4} \frac{1 - \tan x}{x - \frac{\pi}{4}}$

(ii) Find derivative of $f(x) = \frac{\sin x + \cos x}{\sin x - \cos x}$

Q25. Solve the following system of inequations graphically $3x + 2y \leq 24,\ x + 2y \leq 16,\ x + y \leq 10,\ x,\ y \geq 0$

Q26. (i) If $x - y = \frac{\pi}{4}$, prove that $(1 + \tan x)(1 + \tan y) = 2\tan x$.

(ii) If $\cos x = \frac{-4}{5}$, and x lies in the third quadrant, find the values of $\sin\frac{x}{2}$ and $\cos\frac{x}{2}$.

OR

(i) Show that :

$$2\cos\frac{9\pi}{13}\cos\frac{\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$$

(ii) Prove that : $\cos 6x = 32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1$

SUBJECT : COMPUTER SCIENCE (SET-I)

Time : 3 Hrs. **M.M.: 70**

General Instructions :

(i) All the questions are compulsory.

(ii) Programming language: C++

Q1. (a) Distinguish between input unit and output unit. (2)

(b) Explain the three language translators. (3)

(c) Convert the following : (3)

(i) $(95864)_{10}$ to Octal.

(ii) $(1010110101)_2$ to Hex-Decimal

(iii) $(3567)_8$ to Decimal

(d) Find the 8 bits two's complement form of the following decimal number. (1)

-86

(e) What is derived class? (1)

Q2. (a) What is meant by the term Time Sharing OS? (1)

(b) What are keywords? Explain with an example. (2)

(c) Define variable. Which of the following are valid variables? If not, give reason. (3)

(i) e-salary (ii) cons

(iii) 5ABC (iv) area

(d) Why main ( ) function is special in all programs? (1)

(e) Evaluate the following C++ expressions where a, b, c are integer and d, f, g are floating point numbers. The value are a = 5, b = 3 and d = 1.5 (3)

(i) c = a – (b++) * (--d)

(ii) f = (++b) * b – a

(iii) g = ++a * d – b --

Q3. (a) Write a program to input any inches and to print feet and inches. (2)

(b) (i) Define polymorphism with an example. (2)

(ii) What is the Object Oriented programming paradigm? (1)

(c) Explain the following data types with an example :

(i) double (ii) union (3)

(iii) pointer

(d) Differentiate between run time error and logical error. (2)

Q4. (a) Distinguish between if and switch statement. (2)

(b) What is the output of the following : (2)

```
# include<iostream.h>
void main ( )
{
int i = 0;
cout<<i++<<" "<<i++<<" "<<i++<<endl;
cout<<++i<<" "<<++i<<" "<<++i<<endl
}
```

(c) Go through the C++ code shown below, and find out the possible output or outputs from the suggested Output Options (i) to (iv). Also, write the minimum and maximum values, which can be assigned to the variable MyNum. (2)

```
# include<iostream.h>
# include<stdlib.h>
void main ( )
{
randomize ( );
int MyNum, Max = 5;
MyNum = 20 + random (Max);
for (int N = MyNum; N<=25; N++)
cout<<N<<"*";
}
```

(i) 20*21*22*23*24*25

(ii) 22*23*24*25*

(iii) 23*24*

(iv) 21*22*23*24*25

(d) Write a function to pass an array and size and return biggest among all numbers. (3)

(e) What is impact printer? (1)

Q5. (a) Write the name of the header files based upon the following function. (2)

(i) sqrt ( ) (ii) tolower ( )

(iii) strcat ( ) (iv) getchar ( )

(b) Write a program to input n numbers and to arrange all numbers in ascending order. (3)

(c) What is an array variable? How it differs from ordinary variables? (1)

(d) Write a program to input any matrix and to find sum of upper triangular matrix elements. (3)

(e) Calculate size and number of elements from the following array : (1)

double a[20][5]

Q6. (a) Differentiate between call by value and call by reference. (2)

(b) Rewrite the following program after removing the syntactical error(s) if any. Underline each correction. (2)

```
# include<iostream.h>
void main {
struct movie {
char movie_name[20];
char movie_type;
int ticket_cost=100; }m;
gets(movie_name);
gets(movie_type);
```

}

(c) What will be the output of the following segment? (3)

```
struct number
{ int no1, no2;
};
void display(number n)
{ cout<<"Number1="<<n.no1++<<"Number2="<<--
    n.no2<<endl;
}
void main ( )
{ number n1={10,100}, n2, n3;
n3 = n1;
n1.no1 + = 5;
n2 = n3;
n2.no1 - = 5;
n2.no2 * = 2;
n3.no1 + = 1;
display (n1);
display (n2);
display (n3);
}
```

(d) Write an equivalent "do...while loop" for the following "for loop" (2)

```
for (int s = 0, i = 2; i < = 25; i + = 2)
s + = i;
```

(e) What is the use of default argument? (1)

Q7. (a) Write a program to input any string and to find total number of uppercase letters and lowercase letters from the string. (3)

(b) Write a program to input 'n' employees information with employee number, name, department and basic pay and to find bonus. Bonus is calculated by using

following table : (4)

Basic pay	Bonus
> = 50000	20%
< 50000 and > = 30000	15%
< 30000 and > = 15000	10%
< 15000	5%

Print all information on the output screen.

(c) Find the output of the following program : (2)

```
# include <iosteam.h>
# include <ctype.h>
void CangeIt (char Text [ ], char C)
{
for (int K = 0; Text [K]!='\0'; K++)
{
if (Text [K]>='F' && Text [K] <='L')
      Text[K]=tolower(Text[K]);
else if (Text[K]=='E' | |Text[K]=='e')
      Text[K]=C;
else if (K%2==0)
Text[K]=toupper(Text[K]);
else
Text[K]=Text[K-1];
}
}
void main ( )
{
char oldText [ ] = 'Click@CAreeR2016";
ChangeIt (oldText, '%');
cout <<"New Text:"<<oldText<<endl;
}
```

(c) What is program documentation? (1)

SUBJECT : ENGLISH (SET-II)

Time : 3 Hrs. **M.M.: 80**

General Instructions :

1. ***This paper is divided into three sections - A, B and C. All the sections are compulsory.***
2. ***Separate instructions are given with each question wherever necessary. Read these instructions carefully and follow them meticulously.***
3. ***Do not exceed the prescribed word limit while answering the questions.***

SECTION-A (READING)

Q1. Read the given passage carefully and answer the questions that follow : (12 marks)

(1) There is no discounting that one learns some of the more important skills in the classroom but the lessons one learns about life when one leaves the comfort zone of the classroom and steps into the unknown, are incomparable. One of the best lessons, therefore, which is learnt outside the safe confines of the classroom, is what travel teaches you.

(2) If you travel on your own by not opting for a group tour where everything is planned for you, then you are likely to tackle situations where you have to make a choice or a decision almost immediately. No amount of prior research or preparedness can come to your rescue. But on the bright side, travelling alone gives one the opportunity to discover things such as the cheapest and quickest way to travel from point A to B, how much you should trust your instinct when talking to a stranger, how much you should spend each day. All these handy exchanges go a long way in smartening up a person. Also when you are in another country and managing your own affairs you feel less judged and more courageous too.

(3) Modern-day travel has also become a more even playing ground. Whereas previously travel was by and large a rich man's indulgence, today, anybody can travel. But that does not mean travelling on a shoestring budget literally. One of the golden rules of travel planning is to religiously save a certain amount from your allowance and you can easily save enough for a trip once a year. And the trip does not entail making bookings at ridiculously low or shamefully high hotels for accommodation. You can stay with locals, work along the way, eat simple food, take public transport and, more importantly, stick to your budget. These are the essential rules for making the journey hassle-free.

(4) Although travel is about making plans and hoping things turn out exactly as one has planned, when you are travelling around, things are bound to go wrong. The best way out of a bad situation is to remain calm, when faced with such a calamity and learn to be flexible and to roll with the punches. As a travel blogger shared : 'I was once invited by a local in Rome to go and stay with him. I was super excited by the idea. After taking a two hour tiring journey to the address he had mentioned, I found out that he wasn't residing there and was

only playing a prank on me. I was extremely frustrated but in hindsight it taught me acceptance. The time that was gone was gone. Why spoil my whole trip sulking over it?'

(5) Another plus point of travel is that every single time one travels one discovers the romance within oneself. As a tourist one enjoys the beauty of simple everyday life all around. You also become aware of nature all around and sharpen your powers of observation and appreciation. Also when you travel you realize that people all over the world are not very different, although they may do things differently. You realize that you are just another one in this vast world and the world does not revolve around you.

(6) Travel thus helps you to get rid of race, religion and cultural stereotypes. When you travel it is most important to be smart and take some basic precautions while travelling but you also learn to trust good people and your faith in humanity increases. With better roads and better communication at your fingertips, travel is no longer a bogey. There are options galore and tickets can be had months in advance so people are more confident about making their travel plans that will not become nightmares any more.

1.1 On the basis of your understanding of the above passage, answer the following questions by choosing the most appropriate option : (1x4=4)

(a) Handy exchanges with strangers while travelling _____.

(i) smarten up a person (ii) make them suspicious of strangers

(iii) tend to make one careless (iv) make one overtrusting

(b) The travel blogger had a bad experience _____.

(i) in India (ii) in Rome

(iii) in the United States (iv) at home

(c) Travel makes one realize that people _____.

(i) are very different around the world (ii) love to exchange notes

(iii) are not very different (iv) have the same ambitions

(d) Travel helps one get rid of _____.

(i) fear of travelling (ii) lavish spending on travel

(iii) travel being a bogey (iv) race, religion and cultural stereotypes

1.2 Answer the following questions as briefly as possible. (1x6=6)

(a) What are the plus points of opting out of group travel?

(b) How has modern travel become an even playing ground?

(c) How can one tackle situations where travel plans get upset?

(d) What are some of the advantages an individual gains from travel?

(e) What are the precautions that one must take while travelling?

(f) Why is travel no longer a bogey now?

Find out words from the passage that mean the same as the following : (1x2=2)

(a) unworthy of consideration (Para 1)

(b) inevitable part (Para 3)

Q2. Read the following passage carefully and answer the questions that follow : (8 marks)

(1) Presence of pollutants in air is a devastating issue in this automation era. It is more severe because every millionth fraction of a second we inhale the air around us. The most damning aftermath of air pollution is the attack on our respiratory system.

(2) If you suffer from respiratory problems, be cautious : breathing polluted air could hospitalise you with heart disease and pulmonary disorders much quicker than you believe. A recent study at the Harvard School of Public Health in Boston, USA, shows that risk of hospital admissions for people having cardiovascular problems induced by air pollution is nearly double than that for others. In fact the chances of a patient dying of heart disease caused by air pollution shoots up if he or she is experiencing respiratory problems.

(3) It is astonishing that the chronic pollution in Mexico City, which stains the sky yellow and can trigger government warnings to stay indoors, could be killing off residents' sense of smell, as warned by the scientists. Tests show that the residents of the city struggled to sniff out everyday odour like coffee compared to residents of the nearby towns.

(4) The study used records of hospital admissions between 1985 and 1994 in Cook County, Illinois, the most populous county of USA which maintains daily records of levels of particulate matter below the size of 10 micron (PM_{10}) in the ambient air. Researchers categorised and listed people admitted each day of the given period admitted with cardiovascular diseases (CVD), pneumonia and chronic obstructive pulmonary disorder (COPD) induced by air pollution. Amongst these, they made further classification of those suffering from other respiratory diseases, like asthma and acute bronchitis. The figures were then used for statistical analysis.

(5) The analysis showed that pre-existing cardiovascular diseases, particularly conduction defects, dysrhythmia and heart failure, substantially increased risks of hospitalisation caused by pollution. It also showed that asthmatics are more susceptible to pneumonia and cardiovascular complications induced by presence of PM_{10} particles. In fact, people with asthma faced twice the risk of being hospitalised with pneumonia as compared to others. Researchers were also able to conclude that acute bronchitis increased susceptibility to pollution associated admissions for CVD and COPD. The Canadian House of Commons became the first House in the world to pass a Climate Act.

(6) A spin-off of the extensive study and analysis was evidence emerging that PM_{10} concentrations were associated wth approximately 1,600 hospital admissions every year for heart diseases and 740 admissions for COPD - a large proportion of those admitted from the region, according to the study.

(a) On the basis of your reading of the above passage make notes on it, using headings and subheadings. Use recognisable abbreviations. Also supply an appropriate title to it. (5)

(b) Write a summary of the above passage in about 80 words. (3)

SECTION-B (ADVANCED WRITING SKILLS)

Q3. You were invited by the Principal of St. Francis School, New Delhi to attend their Annual Sports Day. However, due to sudden illness, you are unable to attend the same. Draft a suitable reply in 50 words.

OR

Design a poster for your school library on the value of books and good reading habits. Use slogans. (4)

Q4. You are Amit Chakraborty staying at 81, Chitranjan Park, New Delhi. Last month you got an inverter installed at your house through 'Electronical World' of Lajpat Nagar, New Delhi. Now you find that the inverter is not working and the local electrician who examined it has told you that it has some technical defect. Write a letter to the dealer asking him to replace it immediately under terms and conditions of the deal.

OR

You are Ajay/Anita, living at B-3, Saket, New Delhi. Write a letter to the Editor of a newspaper, drawing attention of the authorities towards the insanitary conditions, prevailing in your neighbourhood due to the garbage thrown around by the weekly bazaar vendors who never care to pick up their garbage. (6)

Q5. Our country is prone to disasters like floods, drought, cyclones or earthquakes. Adhoc measures are adopted to cope with every disaster. The slow response results in loss of human life and property. Write an article for a newspaper giving suggestions about disaster management. You may suggest having special equipments, trained personnel, better transport and communication, quick decisions and speedy implementation. (150-200 words)

OR

You have been chosen to speak on the topic 'How to Stay Healthy' in the morning assembly. Write your speech in about 150-200 words. (10)

SECTION-C (TEXT BOOKS AND LONG READING TEXT)

Q6. Read the given lines and answer the questions that follow :

A sweet face,
My mother's, that was before I was born.
And the sea, which appears to have changed less,
Washed their terribly transient feet.

(a) Name the poem and the poet. (1)

(b) What does the poetess say about her mother? (1)

(c) Explain - 'Washed their terribly transient feet'. (2)

OR

I do not understand this child
Though we have lived together now
In the same house for years. I know
Nothing of him, so try to build
Up a relationship from how
He was when small.

(a) Where are these lines from? Whom does 'we' refer to in the above lines? (1)

(b) What is the reason behind the misunderstanding between these two people? (1)

(c) What is the speaker trying to build? (1)

(d) How were things when 'this child' was a little boy? (1)

Q7. Answer any four of the following questions in about 30-40 words each : (4x3=12)

(a) How did Aram justify the act of stealing the horse?

(b) What kind of a bride was Ranga looking for? What were his reasons?

(c) Which immediate changes did Tutankhaten bring about?

(d) Why was the grandmother dissatisfied with the city education?

(e) Why did the narrator of the story 'The Address' want to forget the address?

(f) Compare the history teacher Mr. Braun and Mr. Koch, the mathematics teacher.

Q8. "We have not inherited this earth from our forefathers; we have borrowed it from our children". Margaret Thatcher's words highlight the theme of the lesson 'The Ailing Planet : The Green Movement's Role'. You feel very concerned about this earth which is being destroyed by pollution, deforestation, depletion of resources etc. Write an article in about 120-150 words on 'Save the Planet Earth'. (6)

Q9. Answer any one of the given questions in about 150 words : (6)

Discuss the relevance of the title 'The Portrait of a Lady'.

OR

'He had no premonition that this night call would prove unusual, still less that it would influence his whole future in Blaenelly'. What was the unusual event in store for Dr. Andrew?

Q10. Answer the given question in about 120-150 words : (6)

Describe the funeral scene of the Canterville Ghost.

Q11. Answer the given question in about 120-150 words : (6)

Write a character sketch of Sir Simon Canterville, the ghost.

SUBJECT : PHYSICS (SET-II)

Time : 3 Hrs. M.M.: 70

General Instructions :

(i) All questions are compulsory.

(ii) There is no overall choice but an internal choice is given in one question of 2 marks, one question of 3 marks and in all questions of 5 marks.

(iii) Question numbers 1 to 5 are very short answer questions carrying 1 mark each.

(iv) Question numbers 6 to 10 are short answer questions carrying 2 marks each.

(v) Question numbers 11 to 22 are also short answer questions carrying 3 marks each.

(vi) Question number 23 is a value based question carrying 4 marks.

(vii) Question numbers 24 to 26 are long answer questions carrying 5 marks each.

(viii) You may use the following constants :

$G = 6.67 \times 10^{-11}\ Nm^2\ kg^{-2}$

SECTION-A

Q1. Is the displacement of a particle given by $x = 3\sin\omega t + 4\cos\omega t$ represents SHM? Explain.

Q2. An object of mass m falling from height 'h' takes time t_1 to reach the ground. Another object of mass 2m falling from same height takes time t_2 to reach the ground. If both the object start from rest; find t_1/t_2.

Q3. It is easier to revolve a stone by attaching it to a shorter string rather than to a longer one. Why?

Q4. Identify the sign of the following quantities :

(i) Work done by a man in lifting a bucket out of a well by means of a rope tied to the bucket and passing over a pulley.

(ii) Work done by gravitational force in the above case.

Q5. The Young's modulus of a wire of length L and radius 'r' is Y. If the wire is stretched to double its length, then what will happen to its Young's modulus?

SECTION-B

Q6. A car of mass 1500 kg is moving along a circular level road of radius 150 m with a maximum speed of 15 m/s without skidding. Find (i) force of friction (ii) coefficient of friction between the tyres and the road.

Q7. The frequency of a tuning fork A is 256 Hz. When it is sounded with a tuning fork B of unknown frequency 'f', 4 beats are produced per second. When the prongs of A are loaded with wax, only 1 beat is produced per second. Determine the frequency 'f'.

Q8. One mole of an ideal gas is heated at constant pressure so that its temperature increases by 80K. Find (i) work done by the gas (ii) the change in internal energy of the gas if the heat supplied to the gas is 1.6 KJ.

OR

Derive a relation between the two specifies heats of a gas on the basis of the first law of thermodynamics.

Q9. An object of mass 20 kg is taken to a height of 160 km above the earth's surface.

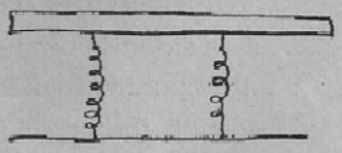
(i) What is the object's mass at this height?

(ii) What is the object's weight at this height?

Take the radius of earth as 6400 km.

SECTION-C

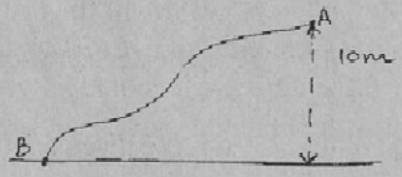
Q11. (i) A tray of mass 12 kg is supported by two identical springs as shown. When the tray is pressed down slightly and released it executes SHM with a time period of 1.5s. Find the spring constant of each spring.



(ii) Write the factors on which the spring constant depends.

Q12. (i) State the principle of conservation of energy.

(ii) A small block of mass 'm' released from rest from A slides down a smooth track as shown. Calculate the velocity of the block when it reaches point B which is 10m below point A.



Q13. Why does water wet the surface of glass? Derive an expression for the rise of liquid in a capillary tube of uniform diameter. Under what condition, do liquids rise/ fall in the capillary tubes?

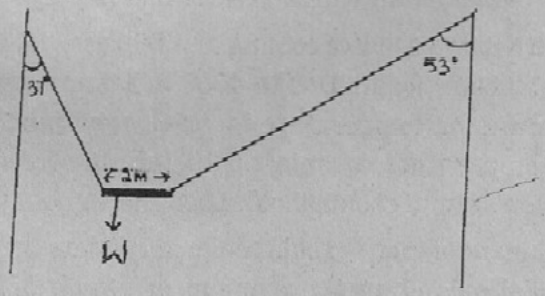
Q14. (i) On what factors does the rms speed of gas molecules depend?

(ii) Write the number of degrees of freedom in a dratomic gas molecule and hence find the value of γ.

Q15. (i) State the triangle law of vector addition.

(ii) The vectors $\vec{A} = a\hat{i} + a\hat{j} + 3\hat{k}$ and $\vec{B} = a\hat{i} - 2\hat{j} - \hat{k}$ are perpendicular to each other. Find the possible values of a.

Q16. A non-uniform bar of weight W is suspended at rest by two strings of negligible weight as shown. The bar is 2m long. Calculate the distance 'd' of the centre of gravity of the bar from its left end.



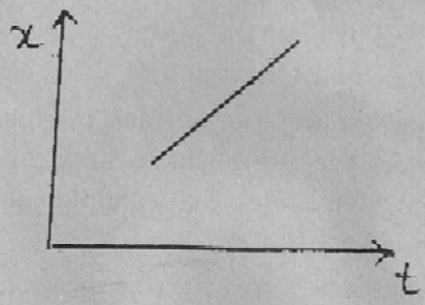
OR

A solid cylinder rolls up an inclined plane of inclination 30°. At the bottom of the plane, the centre of mass of cylinder has a speed of 5 m/s.

(a) How far will the cylinder go up the plane?

(b) Find the acceleration of cylinder as it rolls down the incline.

Q17. (i) From the given x - t graph, find acceleration.



(ii) Two cars A and B are 100 m and 200 m away from an origin at t = 0. They start simultaneously towards each other with speeds 10 m/s and 5 m/s respectively. Find the time and position at which they cross each other.

Q18. What is escape velocity? Derive an expression for escape velocity from the surface of earth.

Q19. (i) An object is moving at a constant speed in a circular path. Does the object have a constant linear momentum? Give reason for your answer.

(ii) When a small car collides head on with huge truck, which is hit with a greater force? Why?

Q20. State Newton's law of cooling and represent it graphically. A body cools from 60°C to 40°C in 10 minutes when the surrounding temperature is 10°C. How much would be its temperature after next 10 minutes? Assume that Newton's law of cooling holds good throughout the process.

Q21. Is moment of inertia scalar or vector? State the theorem of parallel axis. Find the moment of inertia of a thin disc about an axis along a chord distant r/3 from the centre.

Q22. A ball is thrown upwards with a velocity of 30 m/s. Plot its (i) x – t; (ii) v – t; (iii) a – t graphs for 0-6 S. (take $g = 10\ m/s^2$)

SECTION-D

Q23. When Mr. Mohit reached metro station, he saw some children playing happily on the platform by running here and there. The train was approaching and suddenly one of the child went to the edge of the platform to watch the approaching train. Mr. Mohit immediately pulled the child back and explained the reason why he should not stand near the edge.

(i) What values are associated with Mr. Mohit?

(ii) Why should we not stand very close to the moving train?

(iii) Name and state the principle on which your answer is based.

SECTION-E

Q24. Prove the following :

(i) For two angles of projection θ and 90-θ with same initial velocity μ (a) range is same (b) heights are in the ratio $\tan^2\theta : 1$.

(ii) If the range and height of a projectile are equal then the angle of projection is $\tan^{-1}(4)$.

OR

Consider a mass 'm' attached to a string of length l moving in a vertical circle. Find an expression for

(i) tension at any point

(ii) minimum velocity at the lowermost and the topmost point.

(iii) velocity at a point lying on the end points of horizontal diameter.

Q25. What are standing waves? Explain the formation of standing waves by applying superposition principle to wave

functions of incident & reflected waves in case of an organ pipe closed at one end. Discuss the different modes of vibration.

OR

The equation for the transverse wave in a string is given by $y = 5 \sin 2\Pi \left(\frac{t}{0.02} - \frac{x}{50} \right)$ with length in cm and time is s. Calculate the (i) wave velocity, (ii) maximum particle velocity, (iii) displacement of the wave at $x = 100$ cm, $t = 0.2$s (iv) frequency of the wave.

Q26. (i) What is the effect of increase in temperature on viscosity of liquids?

(ii) Using Stoke's law, obtain an expression for the terminal velocity of a small spherical metal ball falling in a liquid.

(iii) Two exactly similar rain drops falling in air with terminal velocity of $2^{1/3}$ m/s each, join to form a bigger drop. Find the terminal velocity of the bigger drop.

OR

Discuss the four steps of a Carnot Engine. Write the expression for its efficiency. What conclusion can be drawn from the expression for the efficiency of the Carnot engine?

SUBJECT : CHEMISTRY (SET-I)

Time : 3 Hrs. M.M.: 70

General Instructions :

i) All questions are compulsory.

ii) Question numbers 1 to 5 are very short answer type questions of 1 mark each.

iii) Question numbers 6 to 10 are short answer type questions of 2 marks each.

iv) Question numbers 11 to 22 are also short answer type questions of 3 marks each.

v) Question numbers 23 is a value based question carrying 4 marks.

vi) Question numbers 24 to 26 are long answer type questions of 5 marks each.

vii) Use log tables, if necessary. Use of calculators is not allowed.

Q1. How many significant figures are present in 0.04597?

Q2. Write the electronic configuration of Cu^{2+} ion. (Atomic number of Cu = 29)

Q3. The electronic configuration of an element is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^2$. Name the period and the group to which it belongs.

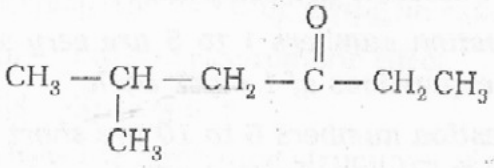
Q4. Write the name of isotope of hydrogen which has no neutron.

Q5. Carbon monoxide gas is more dangerous than carbon dioxide gas. Why?

Q6. A sample of helium has a volume of 500 cm^3 at 373K. Calculate the temperature at which the volume will become 360 cm^3 keeping pressure constant.

Q7. Calculate the molarity of NaOH in the solution prepared by dissolving its 8g in enough water to form 500 ml of the solution. (At. wt. of Na = 23, O = 16, H = 1u)

Q8. (a) Write the IUPAC name of



(b) Write the structural formula of 2-Methyl-4-nitropentan-2-ol

Q9. Predict in which of the following, entropy increases/ decreases :

(i) Temperature of crystalline solid is raised from 0K to 115K.

(ii) $H_2(g) \rightarrow 2H(g)$

OR

Calculate the number of KJ of heat necessary to raise the temperature of 60.0 g of aluminium from 35°C to 55°C. Molar heat capacity of Al is 24 J mol^{-1} k^{-1}.

Q10. 3.0 g of H_2 reacts with 29.0 g of O_2 to yield H_2O.

(i) What is the limiting reagent?

(ii) Calculate the maximum amount of water that can be formed.

Q11. Give suitable explanation for the following :

(i) N has positive electron gain enthalpy while oxygen has negative value.

(ii) $\Delta_i H_2$ value of an element is always more than its $\Delta_i H_1$ value.

(iii) Radius of an anion is more than that of the atom.

Q12. State Dalton's law of partial pressure and prove that partial pressure of a gas is equal to the product of its mole fraction and total pressure in a gaseous mixture.

OR

The density of CO_2 is 0.326 g dm^{-3} at 27°C and 0.25 bar pressure. What is the density of the gas at 47°C keeping the pressure constant?

Q13. Write the molecular orbital configuration of O_2, O_2^- and O_2^{-2}. Arrange them in increasing order of (i) Bond order (ii) Bond dissociation energy.

Q14. Balance the following redox reaction in acidic medium:

$Cr_2O_7^{2-} + Fe^{+2} \rightarrow Cr^{3+} + Fe^{3+}$

Q15. Calculate the free energy change (ΔG) of the following reaction at 700K and predict the feasibility of the reaction at this temperature

$2NO\ (g) + O_2\ (g) \rightarrow 2NO_2\ (g)$

Given ΔH & ΔS for the reaction are -113.0 KJ mol^{-1} and -145 JK^{-1} mol^{-1} respectively.

Q16. State as to why :

(i) Alkali metals are prepared by electrolysis of their fused chlorides

(ii) Sodium is found to be more useful than potassium.

(iii) LiI is more soluble than KI in ethanol.

Q17. (a) Name the class of hydrides to which H_2O belongs.

(b) Why is H_2 more reactive than D_2?

(c) Explain why H_2O_2 cannot be stored for prolonged periods?

Q18. What happens when :

(i) Sodium metal is heated in free supply of air.

(ii) BF_3 is treated with ammonia.

(iii) Al is treated with dil. NaOH.

Q19. Give reason for the following observations :

(i) Diamond is used as an abrasive.

(ii) Boric acid is a very weak acid.

(iii) $PbCl_4$ is less stable than $PbCl_2$

Q20. (i) State Markovnikov rule. Using this rule write the reaction of propene with HBr.

(ii) Arrange ethene, ethyne and ethane in the decreasing order of acidic nature.

Q21. Explain the following reactions, giving suitable example of each :

(i) Friedal-Crafts alkylation

(ii) Decarboxylation

(iii) β-Elimination reaction

Q22. (a) Which out of NH_3 and NF_3 has higher dipole moment & why?

(b) Draw the shape of PH_3 according to VSEPR theory.

(c) Write the number of sigma and π-bonds present in $CH_2 = CH - C \equiv N$

Q23. Water is essential for life. We cannot imagine life without it. Pollution of water originates from human activities. Municipal and industrial discharge lead to water pollution. Organic wastes also create water pollution. Heavy metals from industries create lot of water pollution. Immersion of status of Durga, Ganesha etc. create lot of water pollution. The RWA of Chtranjan Park decided not to put, Durga statue into Yamuna river like every year. This step was highly

appreciated by Delhi Govt. and NGO 'Save Yamuna Project'.

(i) What should be done to reduce water pollution?

(ii) What is the effect of water pollution?

(iii) What is the threat for aquatic animals due to water pollution?

(iv) What values are possessed by the RWA members of Chitranjan Park?

Q24. (i) In photoelectric effect experiment, irradiation of a metal with light of frequency $5 \times 10^{20}\ s^{-1}$ yields electrons with maximum K.E. = 6.63×10^{-14} J. Calculate υ_0 (threshold frequency) for the metal.

(ii) What is the total number of orbitals associated with the principal quantum number, n = 3?

(iii) How many electrons in an atom may have the following quantum numbers :

(a) $n = 4, m_s = +½$

(b) $n = 3, l = 2$

OR

(a) What are the frequency and wavelength of a photon emitted during a transition from n = 5 state to n = 3 state in the hydrogen atom? (Given $h = 6.626 \times 10^{-34}$ Js and the ground state electron energy is -2.18×10^{-18} J/atom).

(b) State Hund's rule of maximum multiplicity.

(c) How does change the velocity of a moving particle alter the wavelength of the particle? (Give the relation only).

Q25. (a) Draw cis and trans-structures for Pent-2-ene. Which isomer will have higher boiling point and why?

(b) Do the following conversion :

(i) acetylene to ethanal

(ii) benzene to cyclohexane

(iii) Methyl bromide to ethane

OR

(a) Explain the following giving an example :

(i) Positive electromeric effect

(ii) Nucleophile

(b) Draw the resonating structures of aniline.

(c) Out of staggered and eclipsed conformation of ethane, which one is more stable and why? (Also draw the conformation)

Q26. (i) Define buffer solution.

(ii) The value of k_c in the reaction :

$2A \rightleftharpoons B + C$ is 2×10^{-3}

At a given time, the composition of reaction mixture is $[A] = [B] = [C] = 3 \times 10^{-4}$ M. In which direction the reaction will proceed?

(iii) Calculate the pH of 5×10^{-3} M NaOH solution.

OR

(i) Consider the reaction :

$N_2 (g) + 3H_2 (g) \rightleftharpoons 2 NH_3 (g) + heat$

Indicate the direction in which the equilibrium will shift when :

(a) temperature is increased

(b) pressure is increased

(c) catalyst is added

(ii) Write the conjugate bases of $HClO_4$ and NH_3

SUBJECT: PHYSICAL EDUCATION
(CODE No. 048)
Second Term Exam. (2015-16)

Time: 3 hrs. M.M.: 70

General Instructions:

(i) All questions are compulsory.

(ii) Answer to questions (1-11) carrying 1 mark should be in approximately 30 words.

(iii) Answer to questions (12-19) carrying 3 marks should be in approximately 100 words.

(iv) Answer to questions (20-24) carrying 5 marks should be in approximately 150-200 words.

(v) Answer to each part of question (25) carrying (2 X 5) marks should be in approximately 70 words.

Q1. Define Skill. (1)

Q2. What is style? (1)

Q3. Define sports psychology. (1)

Q4. What is transfer of training? (1)

Q5. What do you mean by biomechanics? (1)

Q6. What is lever? (1)

Q7. What do you mean by axial skeleton? (1)

Q8. What do you mean by slow twitch fibers? (1)

Q9. What do you mean by body composition? (1)

Q10. What is the aim of CBSE sports? (1)

Q11. What do you mean by health determinant indicators? (1)

Q12. What do you mean by load and adaptation? (3)

Q13. Differentiate between growth and development? (3)

Q14. Clarify the meaning and types of equilibrium. (3)

Q15. Elucidate the meaning of human physiology? (3)

Q16. What is joint? Mention about the major types of joints. (3)

Q17. Discuss any three techniques of behavioral change for physical activity. (3)

Q18. What do you mean by pranayam? Mention the types of pranayam. (3)

Q19. Elucidate about the development of values through Olympic movement. (3)

Q20. Define warming up. Explain the types of warming up. (5)

Q21. Explain the development characteristics of adolescence. (5)

Q22. Enumerate about centre of gravity and their applications in sports. (5)

Q23. What do you mean by circulatory system? Explain about arteries, veins and capillaries in detail. (5)

Q24. What do you mean by indicators of health? Discuss their types in brief. (5)

Q25. Write a note in brief on the following:-

a) Common Lifestyle Diseases. (2)
b) Performance Enhancing Substances. (2)
c) Importance of test and measurement. (2)
d) Shatkarmas or Yogic Kriyas. (2)
e) Respiratory System. (2)

SUBJECT : BIOLOGY

Time : 3 hrs. **M.M. : 70**

General Instructions :

(i) There are 25 questions and 5 sections in the question paper. All questions are compulsory.

(ii) Section-A contains question number 1 to 5, very short answer type questions of one mark each.

(iii) Section-B contains question number 6 to 10, short answer type-I questions of 2 marks each.

(iv) Section-C contains question number 11 to 20, short answer type-II questions of 3 marks each.

(v) Section-D contains question number 21 to 23, long answer type questions of 5 marks each.

(vi) Section-E contains question number 24 to 25 based on Open Text Material provided by CBSE. Each question carries 5 marks

(vii) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks given in Section-D. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

SECTION-A

Q1. What are viruses called obligate intracellular parasites? (1)

Q2. Name the type of epithelium which forms a lining in the alveoli of lungs. (1)

Q3. What term is used for flat membranous sacs present in stroma of chloroplasts? (1)

Q4. Identify a type of molecular movement which is highly selective and requires special membrane proteins and does not require energy. (1)

Q5. Vacuoles are membrane bound structures. What is the boundary of vacuoles known as? (1)

SECTION-B

Q6. Describe the structure of myosin protein that forms thick filaments in the skeletal muscles.

OR

(a) Name the two bones that make up the shoulder girdle.

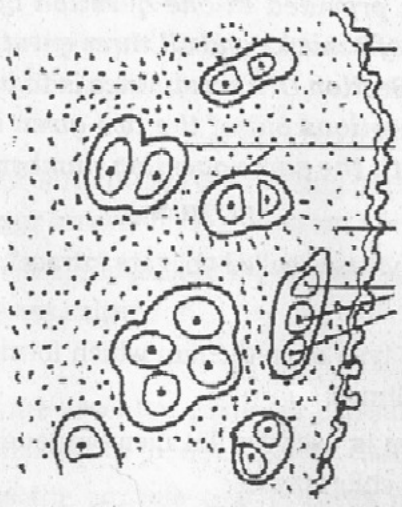
(b) Which joint is present between the shoulder girdle and humerus?

(c) What makes this joint freely movable? (2)

Q7. Graphically represent the concept of Activation energy in enzyme action. (2)

Q8. Define perianth. What term is given to its constituent members? Give an example. (2)

Q9. Identify the tissue shown in the given figure. Name the cells which make up this tissue. How are these cells arranged to form the given tissue? (2)



Q10. Expand the abbreviation RuBP. What is it's role in photosynthesis? (2)

the development of seed.

OR

(a) List the different parts of the human oviduct through which the ovum travels till it meets the sperm for fertilisation.

(b) Draw and label the head region only in human sperm. (3)

Q13. (a) Name the enzyme responsible for transcription of tRNA and the amino acid the initiator tRNA gets linked with.

(b) Explain the role of initiator tRNA in protein synthesis. (3)

Q14. According to the Darwinian theory, the rate of appearance of new forms is linked to their life cycle. Explain. (3)

Q15. (a) Name one primary and one secondary lymphoid organ in human body.

(b) How do they differ in their functions? (3)

Q16. (a) Expand IUD.

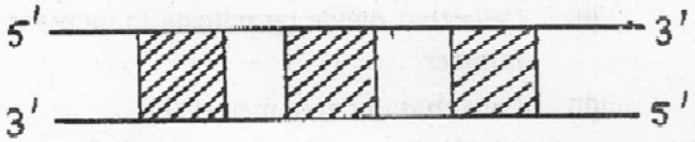
(b) Why is hormone releasing IUD considered a good contraceptive to space children? (3)

Q17. The illustration given is a DNA segment, which constitutes a gene :

(a) Name the shaded and unshaded regions of gene.

(b) Explain how these genes are expressed?

(c) How is this gene different from prokaryotic gene in its expression? (3)



Q18. (a) Name the genus to which baculoviruses belong. Describe their role in integrated pest control management.

(b) How do Mycorrhizae act as biofertilisers. (3)

Q19. What is Ti plasmid? Name the organism where it is found? How does it help in genetic engineering? (3)

Q20. Enumerate any three defence mechanisms evolved by prey species to lessen the impact of predation. (3)

Q21. (a) Differentiate between Detritus Food Chain and Grazing Food Chain.

(b) Why is pyramid of energy always upright? (3)

Q22. Draw a schematic sketch of pBR322 plasmid. (3)

SECTION-D

Q23. Municipal Corporation has deputed personnels to check for mosquito breeding in your school. Answer the following questions :

(a) Which are the places they should check for mosquitoes and their larvae?

(b) Name two diseases which are spread by mosquitoes.

(c) Enlist the important measures that can be taken to control or eliminate the stagnation of water in our surroundings. (4)

SECTION-E

Q24. (a) Draw a well labelled diagram of an anatropous ovule.

(b) Differentiate between endosperm and perisperm giving one example of each.

OR

(a) Draw a sectional view of seminiferous tubule of a human. Label the following cells :

(i) Cells that divide by mitosis to increase their number.

(ii) Cells that undergo meiosis I.

(iii) Cells that undergo meiosis II.

(iv) Cells that help in process of spermiogenesis

SECTION-C

Q11. Triticum aestivum

(a) Give the common name of this plant.

(b) What do the first two letters of the name denote?

(c) Name the scientist who proposed this system of classifying living organisms. (3)

Q12. Explain briefly the following terms with suitable examples:

(a) Anthredium

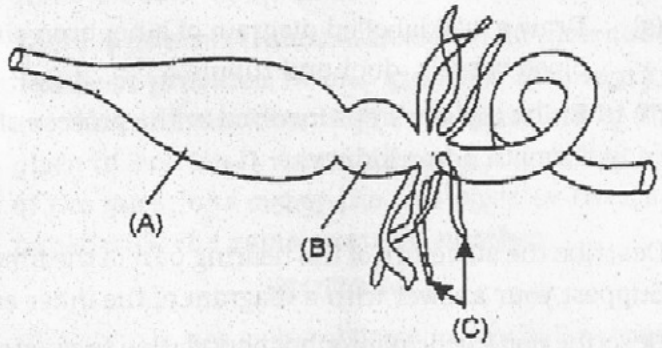
(b) Isogamy

(c) Sporophyll (3)

Q13. Describe vexillary aestivation along with a diagram. Give an example of a plant showing this kind of aestivation.

OR

In the figure, some parts of alimentary canal of a cockroach are shown. Name the organs A, B and C. State the function of each of these organs. (3)



Q14. Draw a well labelled diagram of the T.S. of Dicot root. (3)

Q15. What is competitive inhibition? Explain with a suitable example. (3)

Q16. Describe the events occuring during Pachytene of Meiosis I. Support your answer with a well labelled diagram. (3)

Q17. How is ATP synthesized during oxidative phosphorylation? (3)

Q18. (a) Enlist the factors that govern the active uptake of minerals from the soil.

(b) Define guttation. (3)

Q19. Name any three hormones produced by pars distalis region of pituitary. State the function performed by each. (3)

Q20. (a) Which phytohormone is called stress hormone? How does this hormone overcome stress condition?

(b) Name the phytohormone which is widely used to control weeds. (3)

SECTION-D

Q21. Describe the Watson and Crick model of DNA along with a diagram.

OR

What is centromere? How does the position of centromere form the basis of classification of chromosomes? Support your answer with diagrams showing position of centromere on different types of chromosomes. (5)

Q22. (a) Draw a well labelled diagram of a nephron showing blood vessels, duct and tubule.

(b) Enlist the key steps involved in the process of urine formation in a kidney.

OR

Describe the structure of the hearing part of the inner ear. Support your answer with a diagram of the inner ear. (5)

Q23. Describe non-cyclic photophosphorylation in plants. Why is this process called so?

OR

(a) How are essential elements classified on the basis of functions in plants. Give an example of each.

(b) Name the enzyme that reduces nitrogen in root nodules of bean plant. (5)