2021

BIOCHEMISTRY — HONOURS

Paper : DSE-B-3

(Molecular Diagnostics)

Full Marks : 50

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions: 2×5

(a) What is the clinical significance of aldolase estimation?

(b) What is karyotyping?

(c) What are the advantages of DNA based diagnostic techniques over the others?

(d) State the applications of the technique FISH.

(e) Mention any two types of substrates that are commonly used for the detection of ELISA.

(f) What is myocardial infarction? Name any one enzyme that is used as biomarker for diagnosis of acute myocardial infarction.

(g) What do you mean by sex-linked inherited disorders? Explain with example.

2. Answer ***any two*** questions:

(a) (i) What are VNTR and STR?

(ii) Differentiate between G-banding and C-banding.

(iii) Is a trisomic an aneuploid or polyploid? 2+2+1

(b) (i) Briefly describe one major type of ELISA.

(ii) Which genectic tests are available for the detection of Down Syndrome? 3+2

(c) (i) How is Corona Virus detected by RT-PCR? Explain with schematic diagram.

(ii) Why are inactivation or blocking step and antigen retrieval step important in IHC? 3+2

3. Answer ***any three*** questions:

(a) (i) What are immunosensors? State one application of it.

(ii) State the basic methodological difference between chemiluminescent immuno assay (CLIA) and enzyme-linked immunosorbent assay (ELISA). Which method is advantageous over the other and why?

(iii) How would you detect HbSAg by ELISA?

(iv) What is RAPD? (2+1)+(2+l+)2+2

(b) (i) What is DNA fingerprinting? How can this technique be used for determination of paternal identity? What are the different methods that can be used for analysis of DNA after it is extracted from the sample isolated from crime site?

(ii) How is sickle cell anaemia detected by RFLP? Explain with suitable diagram. (2+2+2)+4

(c) (i) Briefly describe the basic background for any two inborn error of metabolism and their diagnostic procedure.

(ii) Name any two enzymes that are used for the diagnosis of pancreatic function.

(iii) What is the clinical significance of CK and LDH? (2+2)+2+(2+2)

(d) (i) How would you design primers for PCR?

(ii) Show the different steps of FISH with schematic diagram.

(iii) Write short note on RIA.

(iv) What is AFLP? (2+3+3+2)

2021

BIOCHEMISTRY — HONOURS

Paper : DSE-B-4

(Research Methodology)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer ***any five*** questions from the following: 2×5

(a) What is the difference between research methodology and methodology in research?

(b) What is variable?

(c) What do you mean by basic research?

(d) What do you mean by epidemiology?

(e) What is called 'Statistically Significant Data'?

(f) How do you choose study population for your research?

(g) Define SOP.

(h) What is standard error?

(i) What is the significance of doing research?

(j) How would you differentiate between simple random sampling and complex random sampling designs?

2. Answer ***any two*** questions from the following:

(a) What do you mean by 'Sample Design'? What points should be taken into by a researcher in developing a sample design for this research project? 2+3

(b) Distinguish between cluster and area sampling. What are the guiding considerations in the construction of questionnaire? Explain. 2+3

(c) Distinguish between the following: 3+2

(i) Random sampling and non-random sampling

(ii) Point estimate and interval estimation.

(d) What is a t-test? When is it used and for what purpose(s)? Explain by means of examples. 2+3

Answer ***any three*** questions from the following.

3. (a) Distinguish between the following:

(i) Null hypothesis and alternative hypothesis

(ii) Simple hypothesis and composite hypothesis.

(b) What is Chi-square test? Explain its significance in statistical analysis.

(c) Explain the meaning of analysis of variance. (2+2)+3+3

4. Explain the meaning of the following in context of Research design.

(i) Extraneous variables; (ii) Confounded relationship; (iii) Research hypothesis; (iv) Experimental and Control groups; (v) Treatments. 2+2+2+2+2

5. Suppose a certain hotel management is interested in determining the percentage of the hotel's guests who stay for more than 3 days. The reservation manager wants to be 95 per cent confident that the percentage has been estimated to be within ± 3% of the true value. What is the most conservative sample size needed for this problem? Describe briefly the technique of analysis of variance for one-way and two-way classifications. 5+5

6. (a) What is research design? Discuss the basis of stratification to be employed in sampling public opinion on inflation.

(b) The following are the number of departmental stores in 15 cities:

35, 17, 10, 32, 70, 28, 26, 19, 26, 66, 37, 44, 33, 29 and 28.

If we want to select a sample of 10 stores, using cities as clusters and selecting within clusters proportional to size, how many stores from each city should be chosen? (Use a starting point of 10.)

(c) "A systematic bias results from errors in the sampling procedures". What do you mean by such a systematic bias? Describe the important causes responsible for such a bias. 3+4+3

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