M2502 芳香族複素環化学試験問題　　2015/02/10　学籍番号＿＿＿＿＿＿　氏名＿＿＿＿＿＿＿＿＿＿＿＿

E-mail＿＿＿＿＿＿＿＿＿＿＿＿

問 1　“Benzene Since Faraday”を聴き，下記の 10 個の設問に答えよ.

(1) Who isolated benzene by distillation of an Eastern spice “benzoin”?
(a) Faraday, (b) Mitcherlich, (c) Mansfield [　　]

(2) What is the name of the apparatus that the speaker likes?
(a) mass spectrometer, (b) gas chromatography (c) Soxhlet extractor [　　]

(3) What did Perkin use as a solvent in the purification of the black mess he obtained?
(a) aniline, (b) quinine, (c) methylated spirits [　　]

(4) What kind of reaction proceeded by mixing the aniline sulfate with the dichromate?
(a) hydrolysis, (b) reduction, (c) oxidation [　　]

(5) What kind of property of aromatic compounds was applied in the development of ALF?
(a) dry cleaning solvent, (b) dyeing silk, (c) fluoresence [　　]

(6) Who passed an electric charge between carbon arcs to produce soot,
thereby allowing efficient production of C60 and C70?
(a) Kroto, (b) Buckminster Fuller, (c) Krätchmer [　　]

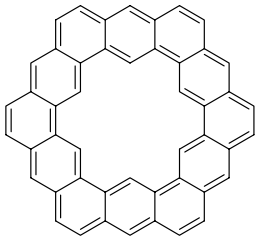
(7) Were there any other elements known to be chromatographically separable
before C60, C70, and C84 were identified as new carbon allotropes?
(a) yes, (b) no [　　]

(8) What does esperamicin D need in the transformation of its ene diyne moiety into a *p*-benzyne structure
to serve as a anti-tumor agent?
(a) enzyme, (b) DNA, (c) sulfur [　　]

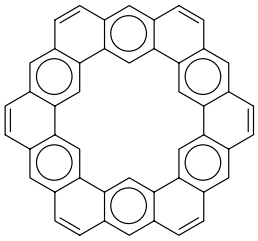
(9) Select a sentence that is similar in meaning to Hofmann’s message that follows “Whenever in future,
one of your chemical friends, full of enthusiasm, exhibits and explains to you his newly
discovered compound, ” at his great lecture in 1862.
(a) You should cool his noble ardor.
(b) You should ask him “What is its use?”
(c) You should let him indulge in the pursuit of truth. [　　]

(10)Put the following events in chronological order
(a) C60 was discovered as a new allotrope of carbon.
(b) Mauve dye was invented
(c) Benzene proved to have a structure of a flat hexagon
(d) An ene diyne was proved to generate *p*-benzyne. [(old)　:　:　:　(new)]

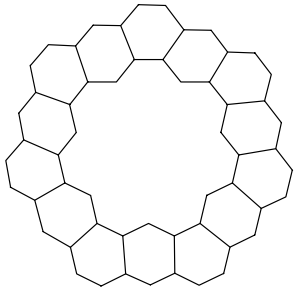
問 2　”The Heptagonal Homologue of Kekulene”と題する論文が 2012 年に発表され(*Angew. Chem. Int. Ed.* **2012**, *51*, 12795)，新たな芳香族化合物 $C_{56}H_{28}$ ”septulene”の電子構造が分光学的に明らかにされた．kekulene の Kekulé 構造(**1a**)と Clar 構造(**1b**)にならい，下図右に septulene の Kekulé 構造と Clar 構造を完成させなさい.



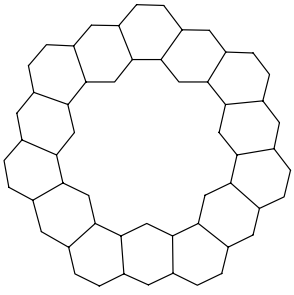
1a



1b



Kekulé structure



Clar structure